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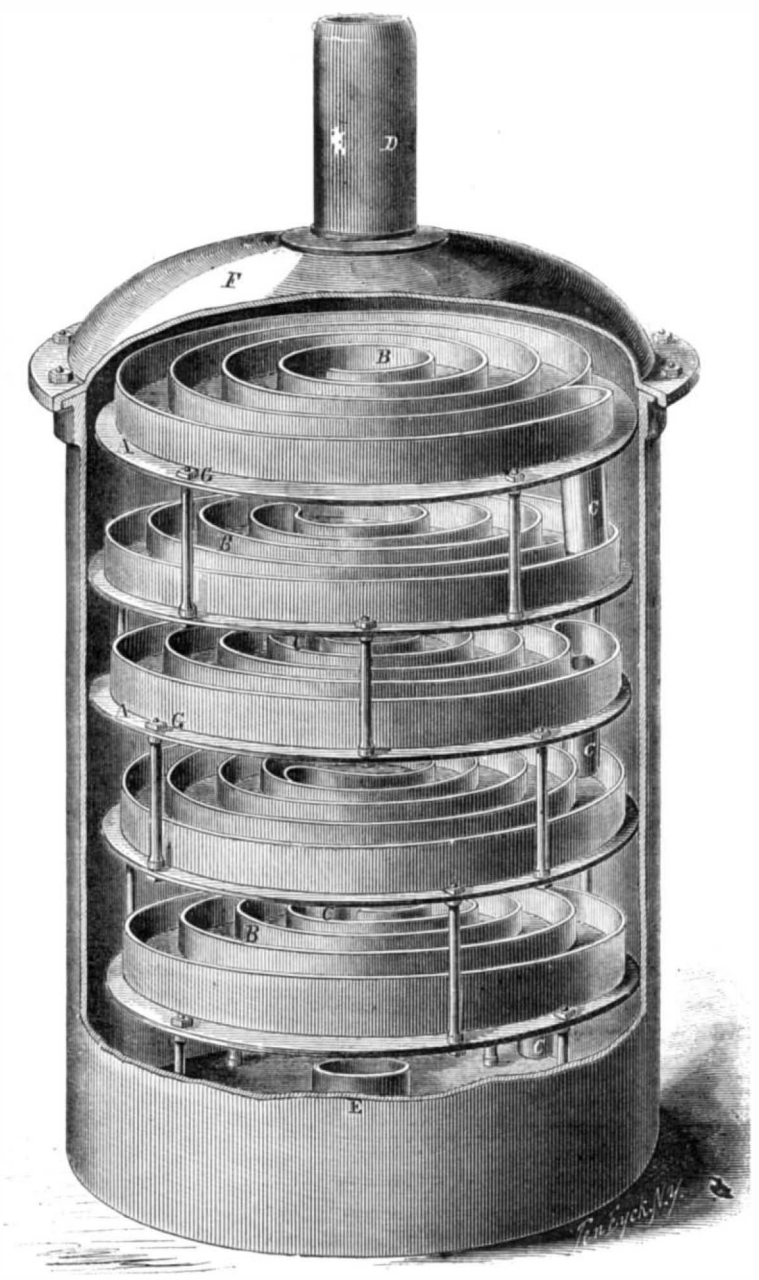
Improved Feed-water Heater.

A very great waste of fuel occurs in high-pressure steam engines where the exhaust passes off without imparting its heat to the feed water. It is well known to engineers that when the boiler is pumped up the pressure generally falls unless the heating surface is ample. The heaters commonly used, although they heat the feed water, are mischievous in another respect, for the exhaust is forced to traverse a coil or its equivalent, and go through intricate passages. This arrests its progress and causes undue back pressure on the piston, which it is desirable to avoid. The heater shown in the accompanying engraving is a very efficient one, for the water passing though it is heated to ebullition, while the exhaust openings are unreduced and unobstructed. The water is introduced to the heater at the top one of the series of plates, A, and flows through the annular channels, B, alternating from the center to the circumference of each in its passage to the bottom. A pipe, C, is fitted at the points above-mentioned, through which the water runs into each partition.

The exhaust enters the pipe, D, and fills the whole cylinder passing around, above and below each plate, so that it is in direct contact with the water to be heated; it finally emerges at the bottom opening, E. The feed water is also taken from the bottom compartment and admitted to the pump, so that by this arrangement the difficulty usually experienced in pumping hot water is obviated.

One great advantage of this heater is the deposition of minerals held in suspension by the water. The scale which ordinarily forms in boilers adheres to the plates of this heater, and may be easily cleaned off. As much as a bushel has been taken out at one time. The plates are readily got at for inspection by taking off the dome, F, each plate can then be lifted out by unscrewing the nuts, G, from the columns which support it. The water in rapid circulation takes up the heat of the steam passing through the heater, and fuel is thus economized and the boiler prevented from the injurious deposit of scale, as previously set forth.

This heater was patented by Messrs. Lamon and Gaskill. For further information address Ehrick Parmly, No 3 Bond street, New York.



LAMON AND GASKILL'S FEED-WATER HEATER.

The Flowing Well at "Pitt Hole."

A correspondent of the Pittsburgh, Pa., *Commercial* gives the following interesting account of a valuable well at Pit Hole, near Oil Creek, Pa.:—

"And what a strange and busy scene around the well itself! To get to it you pass through a forest, or rather grove, of lofty and venerable white pines. What a contrast to the impressive solitude which has reigned there for so long a period, disturbed, perhaps, only by the deer as they came down to drink. A number of men were hewing and hauling logs, and making corduroy roads, to render easier the ascent to the top of the bank. Another number were just putting the finishing strokes to a huge tank, to hold twelve hundred barrels of oil. Numerous horses, sleighs and curious visitors were grouped here and there. Still more men were engaged in filling barrels from the receiving tank, while scores of sleds were loading and driving off as fast as possible, their places being supplied by other scores.

"Mounting a rough ladder, you get your first view of the oil which has been so rudely disturbed from its long slumber far down in the very bowels of the earth. You see nothing but an iron two-inch pipe, with a stream of fluid flowing out as large as a heavy hydrant stream, and looking like country-house molasses and of about the same consistency. Every couple of minutes the gas—which can be plainly seen issuing from the tube-like waves of heat—gives the stream a little spurt, and then it resumes its even and steady flow. Standing over the well, the oil can be plainly heard ascending the tubing. Near by stands the engine-house, with its trim, polished and powerful engine from New York city, looking as demure and innocent as if its ceaseless and powerful workings were not the cause of all this hubbub. No need for an engine now, except to sink another well, for this 'big well' is a *flowing* not a *pumping* one. It runs by nature's gas, not by man's steam. How long it will thus flow, who knows except the Omniscient and Omnipresent Power who made the oil, and who has so mysteriously concealed it in the earth until man's need for it was greatest? The men about the well claimed for it a steady flow of two hundred and twenty-five barrels per day. Experienced oil men who visit it, assert that it flows *strong two hundred*. It may yet come up to three hundred, five hundred or even a thousand barrels per day. Eight or nine thousand dollars a day—minus a quarter royalty—besides the sales of land and leases at enormous figures, will afford the New York petroleumites a snug little interest on their modest investment. This well was sunk through four distinct strata of sand-stone rock, instead of three, as customary in other localities. The first sandstone was reached at one hundred and fifteen feet; the second at three hundred and forty-five feet; the third at four hundred and eighty feet; the fourth at six hundred feet, and the oil itself at six hundred and fifteen feet. The well was pumped for a day or two, but the vast amount of gas in the subterranean caverns or fissures which held the oil, soon rendered useless that expense."

Regarding the social characteristics of the natives in the vicinity of this well, the correspondent promulgates the following scandal. 'Buckwheats' is a rustic cognomen indicative of the principal crop raised by the farmers thereabout:—

"They say here that when the 'Buckwheats' sell their farms for fifty, seventy-five or a hundred thousand dollars, they all go to Westfield or Jimtown, N. Y., to live and spend their money. At one place the farmer had sold out a couple of months before; the ambition of the man was to drive teams, and of his wife to keep a boarding-house for the men. A sled, having on board his whole family, was driven into Oil City by an old farmer carrying with him the title deeds of a fine farm somewhere near Pit Hole. The farm was soon picked up by an agent at a hundred thousand. The farmer's son—a stolid, shock-headed youth—was congratulated by some of the hotel stove-surrounders, when he simply remarked "Dad's farm might be darned good for ile, but it was so poor that dad couldn't raise a pint of beans on it."

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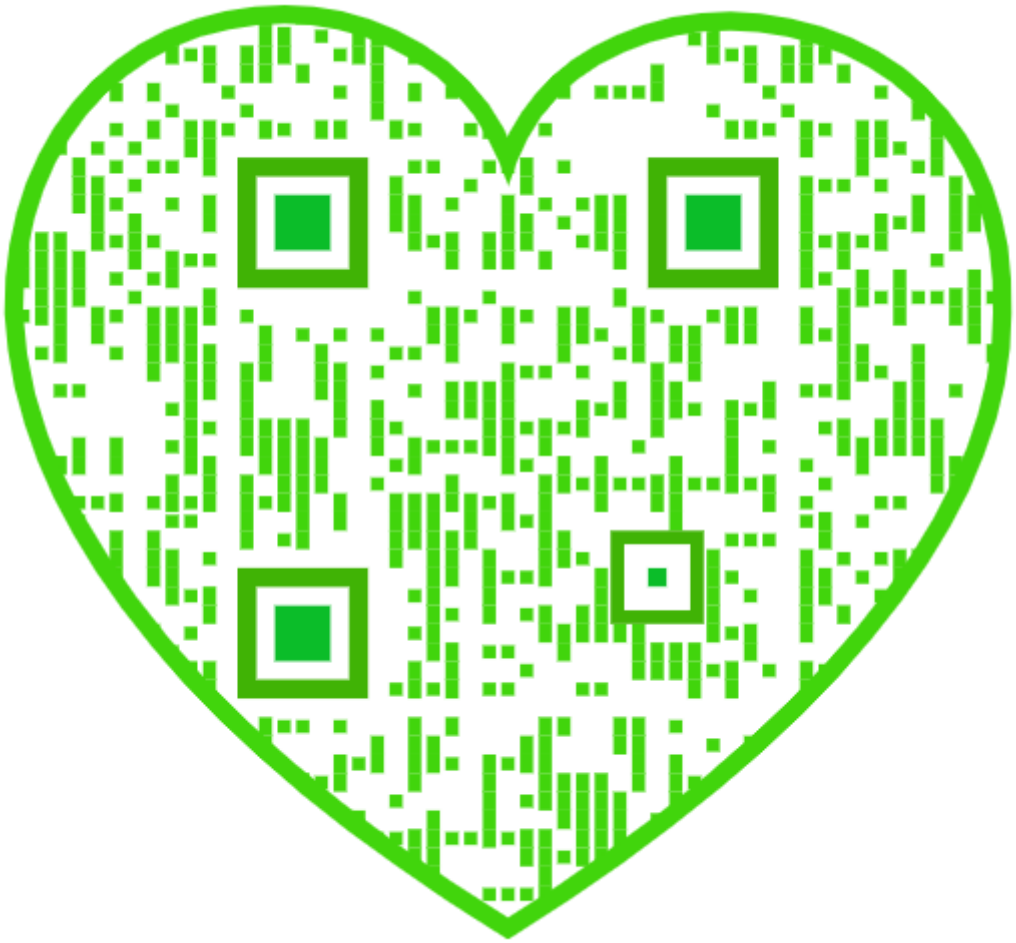

POLYTECHNIC ASSOCIATION OF THE AMERICAN INSTITUTE.

The Association held its regular weekly meeting at its room at the Cooper Institute, on Thursday evening Jan. 19, 1865, the President, S. D. Tillman, Esq. in the chair.

After a long discussion on pumps in which no facts nor ideas were advanced which we suppose would be new to any of our readers, the President invited Mr. Murdock to exhibit drawings of

SHAW'S ENGINE.

This may be described as Roper's air engine, with the addition of a steam boiler in which steam is generated by the exhaust air. An air-tight vessel, corresponding to the boiler of a steam engine, has a furnace within it; the air to supply the fire being forced in by an air-pump. As the air is heated and expanded it is worked through a cylinder, driving a piston as in the steam engine. On its passage from the engine to the chimney the hot air passes through the tubes of a steam boiler, generating steam, which is led into the air chamber containing the furnace, where it is superheated, and then it is worked with the air through the engine. Mr. Murdock having stated that this engine received a Rumford prize of $600, the President invited Dr. Charles T. Jackson, who was present, to give a history of

THE RUMFORD PRIZE.

Dr. Jackson:—Count Rumford left a bequest to the American Academy of Arts and Sciences, of Boston, the oldest scientific association in the country, to be devoted to improvements in light and heat, especially such as should be useful to the middle classes of the people. The Academy unfortunately has not displayed proper activity in discharging the duties of this trust. For forty years the only prizes bestowed were the gold and the silver medal, awarded to Dr. Hare, for the discovery of the compound blow pipe and the calcium light—improperly called the Drummond light. The fund has now increased to $30,000, and recently the members of the Academy have been demanding more energy on the part of the Rumford committee. The gold medal was awarded to Capt. Ericsson for his engine, not because his was the best air engine, but because his inventions and exertions had given such an impetus to efforts in this department, that they might be considered as having led the way to all subsequent improvements. A committee of the Academy, by careful trial, found that Ericsson's engine yielded one horse power by the consumption of 14 lbs. of coal per hour, Roper's by the consumption of 5 lbs., and this of Shaw's by the consumption of 2½ lbs., all being small engines. I have no doubt that this is the best air engine that has ever been produced.

THE GREAT EMERY BED.

By request, Dr. Jackson gave a description of the great emery mine recently discovered by him in Chester, Mass. This description was precisely the same as that published on page 34 of our current volume. Dr. R. P. Stevens asked Dr. Jackson what is the geological formation of this deposit.

Dr. Jackson illustrated the formation by a drawing on the black-board, showing that it is among the metamorphic rocks.

Dr. Stevens:—Has Dr. Jackson any theory of the way these rocks were crystalized?

Dr. Jackson:—I have no doubt it was by the action of superheated water, as illustrated by the beautiful experiments of M. Daubree.

Dr. Stevens:—It would propably be very interesting to the meeting to hear an account of those experiments.

THE EXPERIMENTS OF DAUBREE.

Dr. Jackson:—There is no difference of opinion among geologists in regard to the original formation of the stratified rocks; they were deposited at the bottoms of lakes and oceans. But some of these, since their deposit, have been metamorphosed or changed to a crystalline structure, and there has been much discussion in relation to the agencies by which this metamorphism was effected. It seems to me that M. Daubree has cut the Gordian knot, and has shown that the crystallization was produced mainly by the action of superheated water, that is water heated above the boiling point. This can be done, as you are aware, by confining the water under pressure. M. Daubree enclosed various substances in strong iron tubes, filled the tubes with water, closed them tightly with screw plugs, and had them built into the brick work of gas furnaces, where they were exposed constantly to a high temperature for several weeks or months. Wood thus enclosed was first melted and compressed into a globular mass, and if longer exposed was finally converted into anthracite coal. Glass was decomposed and its silex formed into beautiful quartz crystals. M. Daubree found that if sufficient time was allowed it was not necessary even that the water should be superheated. The warm springs of Plombiers were used for baths by the Romans, who led the water through aqueducts constructed of brick or cement. On examining the material of these aqueducts, which had been subjected to the action of warm water for 2000 years, it was found to be transformed into the same crystalline minerals that occur in the metamorphic rocks.

HEAT AND FORCE OF THE SOLAR SYSTEM.

Professor Helmholtz, in his essay on The Interaction of Natural Forces, recently republished by D. Appleton & Co., presents these facts and calculations in regard to the heat and force developed in the solar system.

THE THEORY OF LAPLACE.

A number of singular peculiarities in the structure of our planetary system indicate that it was once a connected mass with a uniform motion of rotation. Without such an assumption, it is impossible to explain why all the planets move in the same direction round the sun, why they all rotate in the same direction round their axes, why the planes of their orbits, and those of their satellites and rings all nearly coincide, why all their orbits differ but little from circles, and much besides. From these remaining indications of a former state, astronomers have shaped an hypothesis regarding the formation of our planetary system, which, although from the nature of the case it must ever remain an hypothesis, still in its special traits is so well supported by analogy, that it certainly deserves our attention. It was Kant, who, feeling great interest in the physical description of the earth and the planetary system, undertook the labor of studying the works of Newton, and as an evidence of the depth to which he had penetrated into the fundamental ideas of Newton, seized the notion that the same attractive force of all ponderable matter which now supports the motion of the planets, must also aforetime have been able to form from matter loosely scattered in space the planetary system. Afterwards, and independent of Kant, Laplace, the great author of the *Mecanique Celeste*, laid hold of the same thought, and introduced it among astronomers.

The commencement of our planetary system, including the sun, must, according to this, be regarded as an immense nebulous mass which filled the portion of space which is now occupied by our system, far beyond the limits of Neptune, our most distant planet. Even now we perhaps see similar masses in the distant regions of the firmament, as patches of nebulæ, and nebulous stars; within our system also, comets, the zodiacal light, the corona of the sun during a total eclipse, exhibit remnants of a nebulous substance, which is so thin that the light of the stars passes through it unenfeebled and unrefracted. If we calculate the density of the mass of our planetary system, according to the above assumption, for the time when it was a nebulous sphere, which reached to the path of the outmost planet, we should find that it would require several cubic miles of such matter to weigh a single grain.

EFFECT OF CONTRACTION.

Let us make this addition to our assumption; that, at the commencement, the density of the nebulous matter was a vanishing quantity, as compared with the present density of the sun and planets; we can then calculate how much work has been performed by the condensation; we can further calculate how much of this work still exists in the form of mechanical force, as attraction of the planets towards the sun, and as *vis viva* of their motion, and find, by this, how much of the force has been converted into heat.

The result of this calculation is, that only about the 454th part of the original mechanical force remains as such, and that the remainder, converted into heat, would be sufficient to raise a mass of water equal to the sun and planets taken together, not less than twenty-eight millions of degrees of the centigrade scale. For the sake of comparison, I will mention that the highest temperature which we can produce by the oxyhydrogen blowpipe, which is sufficient to fuse and vaporize even platina, and which but few bodies can endure, is estimated at about two thousand centigrade degrees. Of the action of a temperature of twenty-eight millions of such degrees we can form no notion. If the mass of our entire system were pure coal, by the combustion of the whole of it only the 3500th part of the above quantity would be generated. This is also clear, that such a development of heat must have presented the greatest obstacle to the speedy union of the masses, that the larger part of the heat must have been diffused by radiation into space, before the masses could form bodies possessing the present density of the sun and planets, and that these bodies must once have been in a state of fiery fluidity. This notion is corroborated by the geological phenomena of our planet; and with regard to the other planetary bodies, the flattened form of the sphere, which is the form of equilibrium of a fluid mass, is indicative of a former state of fluidity. If I thus permit an immense quantity of heat to disappear without compensation from our system, the principle of the conservation of force is not thereby invaded. Certainly for our planet it is lost, but not for the universe. It has proceeded outwards, and daily proceeds outwards into infinite space; and we know not whether the medium which transmits the undulations of light and heat possesses an end where the rays must return, or whether they eternally pursue their way through infinitude.

QUANTITY OF HEAT IN THE EARTH'S MOTION.

The store of force at present possessed by our system, is also equivalent to immense quantities of heat. If our earth were by a sudden shock brought to rest on her orbit—which is not to be feared in the existing arrangements of our system—by such a shock a quantity of heat would be generated equal to that produced by the combustion of fourteen such earths of solid coal. Making the most unfavorable assumption as to its capacity for heat, that is, placing it equal to that of water, the mass of the earth would thereby be heated 17,200 degrees; it would therefore be quite fused and for the most part reduced to vapor. If, then, the earth, after having been thus brought to rest, should fall into the sun, which of course would be the case, the quantity of heat developed by the shock would be four hundred times greater.

METEORS.

Even now, from time to time, such a process is repeated on a small scale. There can hardly be a doubt that meteors, fire-balls, and meteoric stones, are masses which belong to the universe, and before coming into the domain of our earth, moved like the planets round the sun. Only when they enter our atmosphere do they become visible and fall sometimes to the earth. In order to explain the emission of light by these bodies, and the fact that for some time after their descent they are very hot, the friction was long ago thought of which they experience in passing through the air. We can now calculate that a velocity of 3000 feet a second, supposing the whole of the friction to be expended in heating the solid mass, would raise a piece of meteoric iron 1000° C. in temperature, or, in other words, to a vivid red heat. Now the average velocity of the meteors seems to be thirty or forty times the above amount. To compensate this, however, the greater portion of the heat is, doubtless, carried away by the condensed mass of air which the meteor drives before it. It is known that bright meteors generally leave a luminous trail behind them, which probably consists of several portions of the red-hot surfaces. Meteoric masses which fall to the earth often burst with a violent explosion, which may be regarded as a result of the quick heating. The newly-fallen pieces have been for the most part found hot, but not red-hot, which is easily explainable by the circumstance, that during the short time occupied by the meteor in passing through the atmosphere, only a thin, superficial layer is heated to redness, while but a small quantity of heat has been able to penetrate to the interior of the mass. For this reason the red heat can speedily disappear.

Thus has the falling of the meteoric stone, the minute remnant of processes which seem to have

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played an important part in the formation of the heavenly bodies, conducted us to the present time, where we pass from the darkness of hypothetical views to the brightness of knowledge. In what we have said, however, all that is hopothetical is the assumption of Kant and Laplace, that the masses of our system were once distributed as nebulæ in space.

TINNING SHEET IRON.

Dr. Ure, after giving a brief history of processes formerly in use, says:—"The process of cleaning and tinning at some of the best works now is as follows:—When the sheet iron leaves the plate mill, and after separating the plates, and sprinkling between each plate a little sawdust, the effect of which is to keep them separate, they are immersed, or, as technically termed, "pickled," in dilute sulphuric acid, and after this placed in the annealing pot, and left in the furnace about 24 hours; on coming out, the plates are passed through the cold rolls; after passing through the cold rolls, the plates seem to have too much the character of steel, and are not sufficiently ductile; to remedy this they are again annealed at a low heat, washed in dilute sulphuric acid, to remove any scale of oxide of iron, and scoured with sand and water; the plates in this state require to be perfectly clean and bright, and may be left for months immersed in pure water without rust or injury; but a few minutes' exposure to the air rusts them. With great care to have them perfectly clean they are taken to the stow.

The tinman's pan is full of melted grease; in this the plates are immersed, and left there until all aqueous moisture upon them is evaporated, and they are completely covered with the grease; from this they are taken to the tin pot. and there plunged into a bath of melted tin, which is covered with grease; but as in this first dipping the alloy is imperfect, and the surface not uniformly covered, the plates are removed to the dipping or wash pot; this contains a bath of melted tin covered with grease, and is divided into two compartments. In the larger compartment the plates are plunged, and left sufficiently long to make the alloy complete, and to separate any superfluous tin which may have adhered to the surface; the workman takes the plate and places it on a table, and wipes it on both sides with a brush of hemp; then to take away the marks of the brush, and give a polish to the surface, he dips it in the second compartment of the wash pot. This last always contains the purest tin, and as it becomes alloyed with the iron it is removed on to the first compartment, and after to the tin pot. The plate is now removed to the grease pot; this is filled with melted grease, and requires very skillful management as to the temperature it is to be kept at. The true object is to allow any superfluous tin to run off, and to prevent the alloy on the surface of the iron plate cooling quicker than the iron. If this were neglected the face of the plate would be cracked. The plate is removed to the cold pot; this is filled with tallow, heated to a comparatively low temperature. The use of the grease pots, is the process adopted in practice for annealing the alloyed plates. The list pot is used for the purpose of removing a small wire of tin, which adheres to the lower edge of the plate in all the foregoing processes. It is a small cast iron bath, kept at a sufficiently high temperature, and covered with tin about one-fourth of an inch deep. In this the edges of the plates are dipped, and left until the wire of tin is melted, and then detached by a quick blow on the plate with a stick. The plates are now carefully cleaned with bran to free them from grease. Lastly, they are taken to the sorting room, where every plate is separately examined and classed, and packed in boxes for market.

"The tests of quality for tin plates are—ductility, strength and color. To obtain these the iron must be of the best quality, and the manufacture must be conducted with proportionate skill. This necessity will explain to some extent the cause why nearly all the improvements in working iron during the past century have been either originated or first adopted by the tin-plate makers; and a sketch of the processes used at different times, in working iron for tin plates, will be, in fact, a history of the trade.

A PAIL of water will sometimes stop a squeaking journal when oil is of no avail.

THE LINEN MANUFACTURE IN IRELAND.

Sir Robert Kane, F. R. S., recently read before the Society of Arts a paper from which we take the following extracts:—

"Of all branches of industry, however, that which is of the most importance to Ireland, from the amount of capital it represents, and the number of persons to whom it gives occupation, is the linen trade. I am indebted to the kindness of Mr. M'Ilwrath, secretary to the linen trade of Belfast, for much valuable information on that subject, and also to Mr. M Call, of Lisburn, for many interesting particulars, of which I shall endeavor to lay before the Society such general heads as our limited time may allow.

"The linen trade of which Belfast has been the long established head quarters in Ireland had been rather falling off in amount, until the interruption of the supply of cotton by the American war called it into immensely increased activity. The contrast in this regard is well shown by the following figures:—In 1859 there were in Ireland 82 flax-spinning mills, containing 651,872 spindles, of which 91,230 were unemployed; whilst in 1864 there were 74 spinning mills with 650,744 spindles, of which but 8,860 were unemployed, whilst 50,638 additional spindles were in May last being set to work. Further, in addition to the above there were employed in 1864, 14,648 spindles occupied in making thread, and five mills were in course of erection to contain 45,000 spindles. In regard to power-loom factories for linen, a similar remarkable increase is shown for the same period. Thus, in 1859, there were 28 factories with 3,633 looms, of which 509 were unemployed; whilst in 1864 there were 42 factories with 8,187 looms, of which but 258 are unemployed; 1,685 additional looms were about being set to work at the date of the return in May last. The introduction of the factory system into the linen trade, and especially the power-loom, is comparatively modern, the first spinning mills for flax in Ireland having been established about 1828, previously to which time cotton spinning was much more extensively carried on in Belfast than it has since been.

The great extension of trade and the benefit to the operative classes which followed this change, may be illustrated by the following fact:—When spinning and weaving were done by hand, the firm of Richardsons, of Lisburn, turned out from 15,000 to 20,000 pieces of goods in twelve months; that firm can now deliver 250,000 pieces of bleached goods in the same time.

As to wages in the old day of spinning on the domestic wheel, the earnings were from 2s. 6d. to 4s. (62 cts. to $1.00) weekly, whilst at present in spinning mills the ordinary work-women make from 3s. 6d. to 6s. (86 cts. to $1 50) per week, and superior hands from 6s. to 8s. ($1 50 to $2). The best hand loom weaver can only make 6s. per week, out of which he has to pay charges which leave him only 5s, ($1 25) whereas an expert girl, who can attend to two power looms, can make 10s. ($2 50) per week clear. Thus the earnings of individuals have been materially increased by the introduction of steam machinery in the linen trade; and in regard to the total amount of employment, there were ten years ago, 17,000 persons employed in this trade in and about Belfast, whereas in the present year the number employed in the mills is 25,000, exclusive of the vast number of outsiders who indirectly derive their subsistence from that branch of manufacture.

Coupled with this development of the linen trade there has taken place a great increase in the quantity of flax cultivated in Ireland. During the Crimean war, when the Baltic trade was subjected to certain impediments, the quantity of land under flax was increased, and amounted, in 1853, to 174,579 acres, but on the restoration of peace, the Baltic trade being resumed, the demand for home grown flax diminished, and the cultivation fell off to 91,646 acres in 1858. Since that time it has progressively increased, and has now assumed proportions entirely unprecedented, the quantity in 1863 having been 214,099 acres, and in the present year having increased to 301,942 acres, which at an average of 35 stone of clean scutched flax to the acre, gives the produce of fiber at 10,557,070 stones, or 66,050 tuns; and at an average price of 7s. 6d. per stone, the total value of the crop of the present year is £3,962,989. This great increase of production is accompanied of course with corresponding increase of the export trade.

THE MANUFACTURE OF STARCH.

The extensive discussion of the manufacture of sirup from the starch contained in Indian corn naturally gives an interest to the methods employed for extracting the starch. It is a maxim among chemists never to employ chemical processes when the result can be reached by a mechanical process. Starch exists in grain and can be separated by simply washing. Any one attempting to make sugar or sirup from corn will doubtless find it best to separate the starch first by approved methods, and then treat this pure starch with sulphuric acid to convert it into sugar. We extract from Ure the method practiced in England for separating starch from wheat, and we take from Appleton's Cyclopaedia some statements in regard to the manufacture of starch in this country from Indian corn:—

In England, wheat crushed between iron rollers is laid to steep in as much water as will wet it thoroughly; in four or five days the mixture ferments, soon afterwards settles, and is ready to be washed out with a quantity of water into the proper fermenting vats. The common time allowed for the steep, is from 14 to 20 days. The next process consists in removing the stuff from the vats into a stout, round basket set across a back below a pump. One or two men keep going round the basket, stirring up the stuff with strong wooden shovels, while another keeps pumping water, till all the farina is completely washed from the bran. Whenever the subjacent back is filled, the liquor is taken out and strained through hair sieves into square frames or cisterns, where it is allowed to settle for 24 hours; after which the water is run off from the deposited starch by plug taps at different levels in the side. The thin stuff called slimes, upon the surface of the starch, is removed by a tray of peculiar form. Fresh water is now introduced, and the whole being well mixed by proper agitation, is then poured upon fine silk sieves. What passes through is allowed to settle for 24 hours; the liquor being withdrawn, and then the slimes, as before, more water is again poured in, with agitation, when the mixture is again thrown upon the silk sieve. The milky liquor is now suffered to rest for several days, four or five, till the starch becomes settled pretty firmly at the bottom of the square cistern. If the starch is to have the blue tint, called Poland, fine salt must be mixed in the liquor of the last sieve, in the proportion of two to three pounds to the cwt. A considerable portion of these slimes may, by good management, be worked up into starch by elutriation and straining.

The starch is now fit for boxing, by shoveling the cleaned deposit into wooden chests, about four feet long, twelve inches broad, and six inches deep, perforated throughout, and lined with canvass. When it is drained and dried into a perfect mass, it is turned out by inverting the chests upon a clean table, where it is broken into pieces four or five inches square, by laying a ruler underneath the cake, and giving its surface a cut with a knife, after which the slightest pressure with the hand will make the fracture. These pieces are set upon half burned bricks, which by their porous capillarity imbibe the moisture of the starch, so that its under surface may not become hard and horny. When sufficiently dried upon the bricks, it is put into a stove (which resembles that of a sugar refinery,) and left there till tolerably dry. It is now removed to a table, when all the sides are carefully scraped with a knife; it is next packed up in the papers in which it is sold; these packages are returned into the stove, and subjected to a gentle heat during some days; a point which requires to be skilfully regulated.

In the United States Indian corn and potatoes are most commonly used for starch. The application of the former to this use was patented by James Colman, in 1841, and was successfully practised by Thomas Kingsford, of Oswego, N. Y., in 1842. In 1849 he had a large factory at that place, which is still in successful operation under the direction of Messrs. T. Kingsford and Son, having up to the end of the year 1860 made nearly 30,000 tuns of starch. Its annual production for five years was as follows:—1856, 6,328,453 lbs.; 1857, 8,018,778 lbs.; 1858, 8,686,516 lbs.; 1859, 6,747,586 lbs.; 1860, 8,500,000 lbs.; far exceeding that of any other starch factory in the world for the same time. The total consumption of raw material in the twelve years from Jan. 1, 1849, was 2,476,000 bushels of Indian corn and 164,448 bushels of wheat, besides some damaged flour. The boxes for packing the starch have required 15,000,000 feet of bass-wood, supplied chiefly by the farmers in the neighborhood. The building has a front of 510 feet, and extends back over the Oswego river 250 feet. Its flooring covers 250,600 feet, or nearly six acres. For grinding the corn there are fifteen pairs of buhr-stones, and six pairs of large, heavy iron rollers. The river furnishes the power to drive the machinery, and a steam engine of 140 horse power is provided to make up any deficiency in very dry seasons. The vats employed in purifying the starch have a capacity of 2,200,000 gallons, and the length of gutters for conveying and distributing the starch waters is over three miles. A similar factory, almost or quite similar to this in capacity, commenced operations at Glen Cove, on Long Island, in 1858. This also uses Indian corn, which is more cheaply transported from the western states than the starch from it would be. The product of each bushel is about 23 lbs., and the boxes of the starch, on account of their bulk and the extra care they require, make more expensive freight than the raw material. Potato starch factories are more numerous but not so

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extensive. In the town of Stowe, Vt., there are five of them, each one of which consumes from 16,000 to 20,000 bushels of potatoes yearly, and produces about 8 lbs. of starch to the bushel.

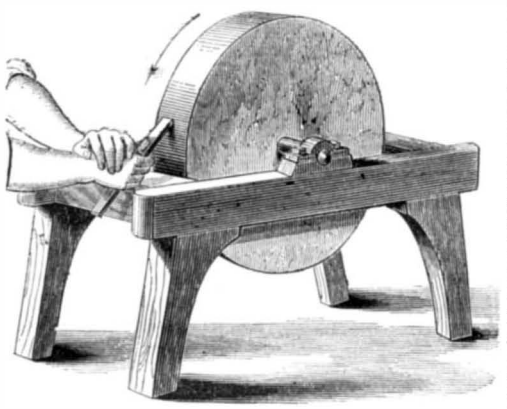
The corn used for starch is the white flint kind. Received at the factory, it is hoisted to the top of the building, winnowed to remove foreign substances, and then transferred to vats, where it is long soaked before grinding. It is run through troughs with water to the mills, and when ground the mixed meal and water is conveyed in a similar manner to the tubs in which the separation of the starch is effected. The gluten fluid that flows from these has a musty and disagreeable odor and appearance in the troughs, and the substance lacks when concentrated the consistency of wheat gluten, not "rising" like it in fermentation by the expansive action of the carbonic acid gas generated in this process. Its only value is for feeding horses, cattle and swine. The starch fluid is conveyed through troughs to great vats in the basement of the building, where the water is partially removed, and then it flows into smaller wooden vessels from which a portion of the surplus water drains away through a cloth laid in the bottom of each. The mass of starch, then tolerably solid, is placed upon shelves made of loose bricks, when more moisture escapes by absorption and evaporation. Kiln drying finishes the process and the starch is obtained in prismatic forms ready to be put up in papers or boxes for the market.

TURNING TOOLS.

PART SIXTH.—THE END.

As grinding a tool and keeping the edge in proper condition is very essential to success, it will not be amiss to state a few facts of importance in regard to it. Inexperienced turners always go on the wrong side of the stone to grind; that is, when it runs from them. Every tool, no matter what its character, should be ground with the stone running toward the workman, as in Fig. 28—the direction of motion be-

Fig. 28.



ing shown by the arrow. The reason for this is apparent to any one who thinks for a moment. It is this—viewed through a magnifying glass the edge of every tool presents a serrated or saw-tooth appearance.

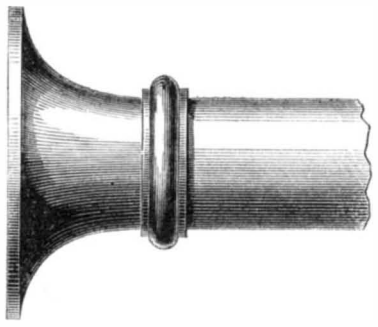
When the tool is ground with the stone running from the operator, all these fine threads, or filaments of steel, are drawn off toward the outside or upper edge, so that it forms what is known as a wire edge; the first application to the work breaks these off, and in a little while the tool is as dull as before it was ground. If, on the contrary, the tool be held against the face of the stone on the running side, as shown previously, the metal will be cut downwards, and a keen sharp edge produced, which will last much longer than when ground on the other side; it only requires an oil stone rubbed over it to remove the asperities and render the edge uniform. As the tool comes from the grindstone it is invariably rough, however smooth it may appear to the naked eye, and it is a good practice to touch up the edge preparatory to putting it in the tool post. It is this rubbing with the oilstone that gives that incomparable finish to wrought iron when the tool is sharp. Such a polish is more durable than any that can be imparted with emery or oil, superior in appearance and cheaper to produce; cardinal points in favor of using a sharp turning tool.

There are many tools which cannot be ground upon the stone without destroying the shape. Tools for forming beads or moldings are of this class, but as they are generally used on cast iron; they are intended to scrape rather than cut, and the faces can therefore be ground flat. It is generally easier to file the tool to the required shape and grind it when dull.

Tools that are filed have two disadvantages which make them inferior to those tempered and ground subsequently. When a tool is tempered, the smith dresses the edge by repeated blows, and compacts the metal at that point very closely, thus making it tougher and finer in grain, The hardening process is also an advantage, for the edge is less apt to be wiry than when the metal is fibrous; which is the case with annealed steel. A tool that is to be filed into shape must necessarily be soft previously, and though the workman may be an adept, he is very likely to slur the fine edge over in forming it, and make it rough and dull, instead of sharp. When the edge of a filed tool is tempered it is apt to crumble, and is, in many other respects, inferior to one that is ground.

For turning a molding or bead on a side pipe, or cylinder head, such as the one shown in this figure,

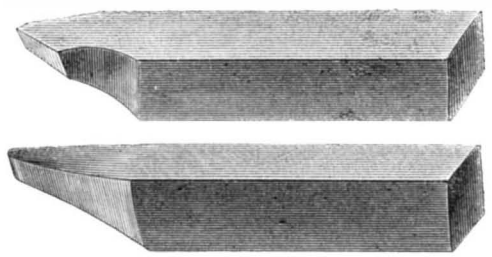
Fig. 29.



it will be found convenient to make the beading tool on the spring plan, illustrated in Fig 18, current volume. By this method it is less likely to chatter or leave ridges or cut roughly.

Of tools other than those used for cutting wrought and cast iron, there are few which are materially different in external appearance. To this statement there is one exception. Brass cannot be cut by the same tools that are used for iron. Below, in Fig. 30,

Fig. 30.



we give examples of tools for turning brass. It will be seen that they are perfectly straight on the upper faces, and have no lips or acute edges. It is not possible to cut brass with a drill, or any other tool, that has a cleaving edge. Such edges draw in to the metal and throw it out of the lathe or else jam and break off. There are compositions of copper and tin, zinc and copper, and others, which can be cut by common tools, but these are not brass, which consists of specific portions of certain metals. One of these tools—the round nose—is used for light cuts, and the other where larger amounts of metal have to be taken off at once.

In turning wrought iron very many turners make their tools quite hard and cut the metal dry or without water; preferring to absorb power rather than soil the lathe with sloppy combinations of iron and water. With proper care but little "muss" will be made, while the gain in time, by using water, is very apparent. Not less important is the power required to drive a given number of lathes. Those which run dry require more than tools used with water, for the simple reason that the friction is greater. Any one can test this to his entire satisfaction by putting a tool in a lathe, starting the cut, and driving the machine by hand. It will be found that when the chip is of such a size that the arm can hardly turn the lathe dry, the addition of water will free it immediately, and the lathe can be driven with ease. If the shears be well oiled previous to beginning a job, the water can be wiped off without injury to them, even though the work be days in progress.

This article concludes the series on this subject. The skilled turner will perceive many cases not laid down in the several papers under this head which might have been alluded to, but it is obviously impossible in the limits of a newspaper to detail every minute manipulation a lathe is capable of. Special instruction on particular points has not been aimed at, but a general and familiar treatise on the tools used in turning.

SEASONING AND DRYING LUMBER AND TIMBER.

[For the Scientific American.]

A COMPARISON OF SUPERHEATED STEAM WITH OTHER MODES OF SEASONING, AS IT REGARDS SPEED, THOROUGH WORK AND CHEAPNESS.

It seems to be a great mystery to the uninitiated how lumber, and other substances, can be dried while in direct contact with steam.

All understand that steamed lumber will dry in the open air, more rapidly after, than before, it is steamed—though all do not understand why it does it. They notice that the lumber comes from the steam in a very wet and soaked state, and the general impression would be, that it would require a longer time to dry than before it was thus soaked.

The fact however that it does dry more rapidly, has induced many to adopt this mode, when they were in haste for some dry lumber, even though practical tests have shown that such steaming injures its beauty of finish, as well as the strength and durability of the lumber and timber. The reason for this will be seen.

This steaming and soaking process extracts the albumen, which if properly coagulated and retained, is a preservative to the lumber. It also expands the pores of the lumber, so that they never shrink again to their smallest size, and do not often return as tubes, but shrink into angles; thus injuring the strength as well as beauty of finish. If these improperly shrunk tubes were placed under a powerful microscope, they would look like hills and valleys and very high ones.

This albumen is somewhat difficult to dry in the pores of the lumber, by air drying, for it does not part with its moisture readily, and when dried in the outside pores of the lumber, it nearly hermetically seals the inside, as it becomes nearly impervious to moisture.

Many attempts have been made to get rid of this albuminous substance in the lumber, for even after it has beer once dried, it will ferment, if water be added, and this fermentation produces eramacausis or dry rot, which destroys millions of dollars' worth of railroad timbers, ties, and bridges, per year, as well as timber in buildings, ships, &c.

Kyanizing, paynizing, burnetizing, and other similar processes, are only modes used to coagulate or chemically change this albumen, by using the various kinds of salts, such as corrosive sublimate, zinc, copperas, &c. Many of these modes have been found to be valuable for preserving the timber from the dry rot. But since these processes are usually performed by soaking or steeping the lumber in a solution of these salts, much of the albumen passes out, to the injury of the lumber; for when all of the strength and beauty of finish is desirable, the albumen should be coagulated and retained in the pores of the lumber. Of course the lumber comes from all these processes as well as in steaming, boiling, or soaking in water—in a wet and soaked state, and must therefore be used in the wet state, or afterwards dried by the air, either naturally or artificially. In either case, the outside of the timber is dried first, and forms an enamel, which will not further shrink, as the drying progresses, and therefore the timber cannot be brought to its smallest size, even though the drying process be continued forever.

Air drying we must remember always commences on the outside of the lumber, and its tendency is to close up its own way, and check materially its own progress, forming an enamel with dried albumen, and by closing the pores of the lumber on the outside first. The further therefore the drying extends into the lumber by this process the slower must be the future drying, for the passage of the moisture from the inside is the more strongly resisted, the thicker this enamel becomes. Is it any wonder, therefore, that the center of thick lumber is rarely ever dried. Comparatively small sticks of oak timber have been used for a fire piece for at least sixty years.

Many millions of dollars have been expended in experiments to season and dry lumber. The result has generally proved to be drying without seasoning, and seasoning without drying. But when both seasoning and drying have been attained by subjecting the lumber first to one process and then to the other, the result has usually been a sacrifice of the strength and

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durability of the lumber, as well as its beauty of finish, to say nothing of time and expense.

In contrast with the foregoing plans we will now examine the new mode, that seasons and dries at the same time, by what is called superheated steam without pressure, or with the simple pressure of the atmosphere. No other mode known to science has ever accomplished this, and yet the process is a very simple one, as I shall attempt to show, though I may fail to make it fully understood in an article that would not be too long for insertion here. If the principle, however, should still be obscure to any one they can inquire by mail.

Suppose a room 14 feet high be divided so that the lower room shall be 8 feet and the upper one 6 feet high. The lower we will call the fire steam room, and the upper the lumber or drying room. The division, however, between these rooms is only the joist on which the lumber is piled, or that sustains the cars on which the lumber is dried, and on which it is passed into and out of the dryer. The two rooms are, therefore, virtually one.

A stove or other heater, with long radiating or smoke pipe, to save all of the heat from escaping into the chimney, as well as to generate heat rapidly, is placed in the fire room, with the door of the stove opening out to supply fuel. This stove and the radiators are placed quite at the lower part of the fire room, which avoids the direct heat of the stove on the lumber, and also to occupy the coldest part of the room, which is the most favorable for obtaining all the heat of the fuel.

A steam generator may be so arranged at a small expense, in connection with the heater, that steam will be generated just in proportion to the heat made.

This steam, whether generated in this or in some other convenient way, should be just sufficient in amount to fill both the fire and lumber room, with no steam to pass off to waste the heat. As soon as the rooms are filled with steam the air is excluded and the steam takes its place for conveying caloric. Steam will convey heat by convection 90 to 300 times as rapidly as air.

This steam atmosphere is not one that can be seen but one that can be felt. It starts a free perspiration from all of the pores of the skin when you go into the kiln. It does the same thing to lumber, for it never wets or swells the lumber as by common steam, but the first act is a drying one, as the tendency of the moisture of the lumber is all outward; let us see how this is accomplished.

Steam as soon as it is generated rises. As soon, however, as a particle of steam meets a body colder than itself it instantly imparts its heat to that body and is condensed. This particle of condensed steam descends by its own gravity to the fire room. Here it comes into contact with the stove or radiators, and is re-converted into steam, and carries its heat to the lumber and descends again in its condensed form for more heat. This one particle of steam may carry up heat in this way a million times, and yet it has imparted no moisture to the lumber, as it has returned with its moisture in the shape of condensed steam. If by any accident this one particle of steam is absorbed or lost, the steam generator supplies another particle to take its place, and thus preserves a constant steam atmosphere among the timber, not only to convey heat but to shut out the air.

It is worthy of note in this connection, to state that a particle of steam will instantly receive as many degrees of heat as there are degrees in the heater with which it may come in contact. If for instance the stove should be red-hot, and the particle of returning or condensed steam should come in contact with the red-hot iron, this particle of steam would instantly receive at least 900 degrees of heat. This 900 degrees of heat would be carried to the lumber, and the condensed particle of steam would return for more heat in the same time as though it carried only 212 or any other number of degrees of heat.

It is also worthy of note that the tendency of steam is to fly to the coldest place to impart its heat. If, for instance, a ball of ice were suspended at the ceiling of a room, and some water should be thrown upon a hot stove in the room the steam thus generated would go continually to the ice until it was melted. Thus as an equalizer of heat steam has no equal

This superheating and condensing of steam in particles goes constantly on in the kiln, and with a rapidity just in proportion to the amount of heat generated by the stove or heater. All of the heat which the stove makes the steam will absorb and convey to the lumber. If heat is generated rapidly the steam will convey it rapidly to the lumber. Inch lumber has in this way been thoroughly seasoned in six hours.

This mode of heating and condensing progresses until the lumber is so hot that the aqueous or watery portion of the sap is changed into steam.

Up to this time you will notice all of the heat we have made is yet in the kiln, for there has been no means of escape to waste it, nor have we made the lumber wet or damp by the steam since the steam has only imparted its heat and not its moisture or condensed steam.

But when the lumber is all so hot as to generate steam rapidly from the water it contains, then there will be more steam than the kiln can contain, for it was full of steam before. This excess of steam must pass out of the kiln or the kiln would burst and the lumber would never become dry.

When this surplus heat passes out it escapes through sawdust or a similar device to retain the heat while getting rid of the steam. This sawdust should be of such a thickness as to balance the steam, retaining a full steam atmosphere inside, while the surplus steam passes out, taking with it the moisture from the lumber. As there is a steam atmosphere at all times surrounding the lumber to be dried, it cannot dry the outside first and form an enamel, as in the case of air drying.

The nature of steam is so penetrating that it finds the center of the lumber, before the drying has made any considerable progress. After the drying commences steam generated from the lumber is constantly flowing out, so that the pores of the lumber cannot close until the moisture is principally out of the lumber, and then the center must dry first, for the steam must leave the center before it leaves the outside.

When the aqueous portion of the sap has all been converted into steam and passed out of the lumber, it creates a vacuum which the pores of the lumber close to supply. When this is done the lumber has shrunk to its smallest size, or to as nearly a solid as drying can make it.

But as there is moisture in red-hot iron, so there must be some moisture left in the lumber after the pores close and after the shrinking is all done. Indeed if the moisture was all removed the lumber would be ruined for charring commences long before the moisture is all out.

By gaging a piece of timber in the kiln from day to day, it is quite easy to ascertain when the shrinking is all done. When the shrinking of the lumber is completed there is no further advantage in drying, but a positive injury, as far as the strength and toughness is concerned, for the more moisture there is left in the lumber and timber after the shrinking is all done, the better. If desired, however, the lumber may come from the steam in a dryer state than the air can ever make it.

I am admonished, however, that this article will soon be too long for insertion in the Scientific American, and I will reserve, perhaps for No. 3, the degrees of heat necessary to coagulate albumen in lumber at its different stages of drying, and perhaps say something of the degrees of this kind of heat desirable in the drying of fruit and vegetables, and also show why we may use a higher degree of this kind of heat than of air in drying delicate fruits, milk, etc., and still not injure them. I have dried apples in a heat of 239° and still they showed no indications of being cooked by the process, but came out very white and beautiful.

But before I close I will bring into juxtaposition superheated steam and other modes of drying, in order to show the advantages of superheated steam by comparison.

The air dries only. Superheated steam seasons and dries at the same time. The air dries slowly—steam quickly. The air produces decay and wastes heat while drying. Superheated steam adds strength and beauty of finish and saves heat. The interest on lumber while air drying must be for years—steam for days. Air can never shrink lumber so thoroughly that steam can not shrink it more, either in size or weight.

Common steaming, kyanizing, paynizing, and burnetizing, all season lumber, but swell it to its utmost capacity, and leave it wet and soaked. It would require more fire to dry this soaked lumber by the hot air process than to season and dry it from the green by the new mode. If the lumber is to be immediately shipped the difference in weight will be from 1400 to 2000 pounds per thousand feet board measure.

One month's stock of lumber for a manufacturer having a proper steam dryer will give him better seasoned lumber than a four years' stock in the air, thus saving the interest on stock, storage, checks, splits, warps and decay, incident to open air drying. The interest at 10 per cent on lumber costing only 40 cents per M. will be $16 while air drying for four years, and then that same lumber is not fit for good work unless kiln dried. It can be seasoned and dried by superheated steam, in a better manner than any other, at a cost of 50 cents to $1 per M., according to the expense of fuel. H. G. Bulkley.

Cleveland, Ohio, Jan. 9, 1865.

VALUABLE PRACTICAL RECIPES.

To Etch Alabaster—Cover every portion of the model or cast, except the portion to be etched, with a mixture of one part of white wax, dissolved in four parts of oil of turpentine, thickened with finely powdered white lead. When this coating is set, immerse the article in pure water, and allow it to remain for from twenty to fifty hours, according to the effect intended to be produced. Then take it out, remove the superfluous water, wash off the varnish with oil of turpentine, and carefully brush the etched parts over with powdered gypsum.

Alabaster, to Join.—Ornaments of alabaster or plaster may be joined together by means of a little white of egg, thickened with finely-powdered quicklime, or by a mixture of newly-baked and finely-powdered plaster of paris, mixed up with the least possible quantity of water.

Almond Paste.—Blanched almonds 4 oz.; white of 1 egg; spirit of wine and rose water, q. s. Beat the almonds to a smooth paste in a mortar, then add the white of egg and enough rose water, mixed with one-half its weight of spirit of wine, to give the proper consistence. Use as a cosmetic, to prevent chapped hands, etc.

Amber is Joined and Mended by smearing the surfaces of the pieces with linseed or boiled oil, and then strongly pressing them together, at the same time holding them over a charcoal fire, or heating them in any other way in which they will not be exposed to injury.

Amber is Worked in a lathe, polished with whiting and water or oil, and finished off by friction with flannel. During the operation the pieces often become hot and electrical, and fly into fragments, to avoid which they should be kept cool, and only worked for a short period at a time. The workmen are said to suffer considerably from electrical excitement, often experiencing severe nervous tremors of the hands and arms.

Bell Metal.—Melt together, under powdered charcoal, 100 parts of pure copper, with 20 parts of tin, and unite the two metals by frequently stirring the mass. Product very fine. Another method is to take of copper 3 parts; tin 1 part, as above. Some of the finest church bells in the world have this composition.

Popular Remedies for Coughs.—Sirup of poppies, 1 dessert-spoonful; antimonial wine 20 drops; mix for a dose, to be taken in a little warm tea on going to bed. Another—Laudanum 30 drops, vinegar and honey, of each a dessert-spoonful, ipecacuanha wine 25 drops; mix for one dose, as last. Another: milk of almonds 4 oz., sirup of squills and tolu, of each, 1 oz.; mix. A tablespoonful every two hours.

Furs may be preserved from moths and insects by placing a little colocynth pulp (bitter apples), or spices—as cloves, pimento, etc.—wrapped in muslin among them; or they may be washed in a very weak solution of corrosive sublimate in warm water, 10 or 15 grains to the pint, and afterwards carefully dried. Furs, as well as every other species of clothing, should be kept in a clean dry place.

Portable Lemonade.—Tartaric or citric acid, 1 oz.,

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finely-powdered loaf sugar ½ lb., essence of lemon 20 drops; mix; 2 or three spoonsful make a very pleasant glass of extemporaneous lemonade. Another—Powdered sugar 4 lbs.; citric or tartaric acid 1 oz.; essence of lemon 2 dr.; mix well. As last. Very sweet and agreeable.

Tinning.—Plates or vessels of brass or copper, boiled with a solution of stannate of potassa, mixed with turnings of tin, become, in the course of a few minutes, covered with a firmly attached layer of pure tin. A similar effect is produced by boiling the articles with tin filings and caustic alkali, or cream of tartar, In the above way, chemical vessels made of copper or brass may be easily and perfectly tinned.

New Tinning Process.—The articles to be tinned are first covered with dilute sulphuric acid, and when quite clean in warm water, then dipped in a solution of muriatic acid, copper and zinc, and then plunged into a tin bath to which a small quantity of zinc has been added. When the tinning is finished, the articles are taken out and plunged into boiling water. The operation is completed by placing them in a very warm sand bath. This last process softens the iron.

Kustitien's Metal for Tinning.—Malleable iron 1 lb., heat to whiteness; add 5 ounces regulus of antimony, and Molucca tin 24 pounds.

The Water Supply of London.

A London weekly paper says:—Three of the great water companies extend their suction pipes of supply as far as Hampton. Miles and miles into the country we may see great mains a yard in diameter, dipping under the Thames, crossing the deep ditches, and passing along the fields and furzy commons, at certain points intercommunicating with each other, in case either may require temporary help. The far off source is little dreamed of by the thirsty soul, who quaffs from the drinking fountain in the crowded street.

He little fancies that he is sucking from a stream through ten miles of iron pipe, the end of which dips into the Thames close to Wolsey's pleasant palace. The great mains of all the companies are thirty six inches in diameter, and it must be remembered that they are free and fully charged at all times, so that in case of fire the fireman has only to turn the plug to get any quantity of water he requires. In some cases—such as at the great fire in Tooley street—thousands of tons of water are thus abstracted gratuitously without interfering with the supply to the houses.

"At the beginning of the present century, the mains, indeed all the pipes, were wooden—the trunk of trees bored out—and in no case of more than one foot in diameter. How the metropolitan giant must have grown, the size of his present iron arteries is a proof. The mains of the eight water companies not only supply London proper, but push far out into the country, invading even the agricultural districts, and supplying its farms. They distribute in the aggregate upwards of 100,000,000 of gallons daily, through 30,000 houses and factories, through capillary pipes upwards of 7,000 miles in length.

If all the water daily used in this great city were collected in one great reservoir, it would cover seventy acres in extent and six feet in depth. As the spectator watched this great expanse of water, he would see it hour by hour drained to the bottom by the collective millions in the metropolis as calmly and noiselessly as a cup is drained by a dusty roadside traveler. The collective iron heart, the steam engines which propel this floold, possesses a force of not less than nine thousand horses.

The Art of Agriculture.

The art of agriculture consists in three things—in keeping the soil rich, light, and free from weeds. If this is done any plant will grow vigorously, if it is not done, no plant will grow.

In man, there is but 6 ounces' weight of stomach to 100 lbs. of body, which is one reason why our food must be in a concentrated form, and why, although the potato or other vegetables may keep us in good flesh, yet to sustain the energies of the system, particularly for those who do the most labor, the greater concentration of a meat diet is absolutely essential.

Correspondence

Rollers Under Slide Valves.

Messrs. Editors:—A remark on page 47 relating to the large engines for the new fast frigates, explaining that the valves have steel rollers under their bottoms and under their steam faces to relieve the friction, says with justice that rollers for this purpose would *seem* to be difficult to regulate so as to be beneficial. The apparent or real difficulties have defeated all efforts at improvements in this direction until quite recently.

There are now a large number of government and private vessels and a larger number of locomotives running with such rollers. They are arranged according to a patent issued to Richard C. Bristol, of Chicago (now residing temporarily in New York), dated Nov. 13, 1860. This engineer has with untiring zeal labored on successive improvements in this line since 1858, and deserves the credit of contributing very largely by these improvements to overcome what might otherwise have been fatal difficulties in our new-school war vessels.

The rollers in all cases are less than two inches in diameter. Under the largest valves they are each about 2½ inches in length and are packed closely together in three lines, one line under each side, and one along a bearing provided in the middle, with liberty in each case to travel back and forward a distance equal to half the greatest travel of the valve. The rollers which take the *weight* of the valve are slighter and of far less consequence. All are of hardened steel, and hardened steel ways are mounted on the valve and also on the cylinder face to support the stress. They are made at first to take very little or no strain, but are very accurately turned of uniform size. As the face of the valve and of the cylinder rapidly wears off under the great friction the rollers begin to support the load and ultimately take nearly the whole of it without inducing leakage.

The Reading Railroad and the Connecticut River Railroad have each had one or more locomotives thus provided upwards of a year. The New York and New Haven Railroad, the New York and Erie, the Chicago and Fort Wayne, Atlantic and Great Western, Michigan Central, Milwaukee and La Cross, and several other important lines of Railroad have more recently applied the same to some of their locomotives. There are many points of importance to be attended to in carrying out the idea, but they have been successfully mastered.

Thomas D. Stetson.

New York, Jan. 20, 1865.

[The rollers under the bottom to carry the weight of the valve strike us as being quite as important as the others, for at that point two metallic surfaces of greater or less area, according to the size of the valve, would be in contact, creating immense friction and adding very much to the labor on the connections. The Government seems to doubt the efficiency of the rollers in the case of the frigates, for the engines to these ships have their valves balanced by other means in addition to the rollers.—Eds.

New York Milk Business.

The milk received in New York comes to the city mostly by rail, and is brought from distances varying from ten to one hundred and fifty miles. The amounts received daily over the principal railroads are: Erie, 88,000 quarts; Harlem, 100,000 quarts; Hudson River, 16,000 quarts. To these amounts must be added 75,000 quarts produced by the city. Although many establishments sell nothing but undiluted milk, still old dealers are honest enough to say that to any calculation concerning the retail business, it is perfectly safe to add twenty per cent for water. The following prices show the increase of rates since 1842. In that year milk was retailed for four cents a quart. In 1854 the price increased to five cents; in 1857 to six cents; in 1862 to seven cents; in 1863 to eight cents, and is now selling for twelve cents. Some idea of the magnitude of the milk business may be gained from the fact that there are over four thousand persons engaged in its distribution in the city A very spirited rivalry has sprung up between the retailers of milk in its crude form and those who condense it. Of the latter there are but three companies in the city; but the amount supplied by them is equal to the sale of at least ten companies dealing only in the crude artic'e. It can be said generally that most companies engaged in the sale of milk have within the last five years sought to sustain an honest reputation by the sale of pure milk only.

MARKET FOR THE MONTH.

The great feature in the markets during the month of January was the great decline in gold, which fell at one time as low as 197. While gold is falling trade from first hands is almost wholly suspended, as jobbers are afraid that they will not be able to sell their goods at cost. On the 25th of the month gold had rallied a little, and prices of the leading staples compared with those at the close of December are as follows:—

	Price Dec. 29.	Price Jan. 25.
Coal (Anth.) ₩ 2,000 lb.	$9 50 @10 50	$12 00 @12 50
Coffee (Java) ₩ lb.	48½@ 50	47 @ 48
Copper (Am. Ingot) ₩ lb.	48½@ 49	45 @ 46½
Cotton (middling) ₩ lb.	1 14 @ 1 15	84 @ 85
Flour (State) ₩ bbl.	$9 45 @10 25	$9 20 @ 9 70
Wheat ₩ bush.	$2 12 @ 2 80	Nominal.
Hay ₩ 100 lb.	$1 50 @ 1 65	$1 50 @ 1 90
Hemp (Am. drs'd) ₩ tun.	340 00@400 00	$320 00@390 00
Hides (city slaughter) ₩ lb.	13 @ 13½	13 @ 13½
India-rubber ₩ lb.	70 @ 1 20	72 @ 1 20
Lead (Am.) ₩ 100 lb.	15 00	13 00
Nails ₩ 100 lb.	$8 50 @ 9 00	8 50 @ 9 00
Petroleum (crude) ₩ gal.	50½@ 51	45 @ 45½
Beef (mess) ₩ bbl.	$19 00 @24 00	19 00 @24 00
Saltpeter ₩ lb.	30	30
Steel (Am. cast) ₩ lb.	19 @ 34	19 @ 34
Sugar (brown) ₩ lb	16½@ 25	16 @ 22
Wool (American Saxony fleece) ₩ lb.	90 @ 1 10	90 @ 1 10
Zinc ₩ lb.	18 @ 19	18 @ 19
Gold	2 24	2 05

Internal Revenue from New York City.

Besides the duties on imports paid by the City of New York, the entire receipts of the National Government here, from ordinary collections, which to the end of December were $27,000,000, and from stamps and special collections about $7,000,000 more, foot up $34,000,000.

The internal revenue estimates for the ensuing year, including $30,000,000 from the Assessors' lists, are $36,000,000. Good judges believe that the aggregate sum which will be returned to the close of the year will not be less than $40,000,000.

RECAPITULATION.

Receipts from Collectors of Internal Revenue in New York to Dec. 1, 1864	$27,000,000
Receipts from sales of revenue stamps	6,000,000
Receipts from banks, insurance companies, and other sources	1,000,000
Total internal revenue in two years and three months in New York	$34,000,000
Estimates for 1865.	
Receipts from Collectors of Revenue	$30,000,000
Receipts from sales of revenue stamps	5,000,000
Receipts from banks and other sources	1,000,000
Total estimate of internal revenue in New York from Jan. 1 to Dec. 1, 1865	$36,000,000

Newspaper Agency Business.

As an interesting item of news, and in order that our readers may have some idea of the enormous business done in this city, at the present time, by newspaper agents, we will mention the fact that the cash receipts of the American News Company for the eleven months ending with the 31st of December last, reached the sum of $2,226,872 83. Within that time forty millions of newspapers alone were handled and packed by persons in the employ of the company. Beside newspapers there were shipped to agents in various sections of the States a vast number of magazines, books, stationery, etc. For wrapping paper and twine with which to pack this vast mass of literary matter the company paid twelve thousand dollars. This is the business of one news agency alone. Ten years ago, in 1854, the total sales abroad by newspaper, book and periodical agency in this city did not exceed three-quarters of a million of dollars. These results are most gratifying, as they assure us that intelligence keeps pace with population, and that the general prosperity of the people has not been checked materially by the insurrection now raging in the slave states.

BINDING.—Those of our subscribers who wish to preserve their numbers of the Scientific American for future reference, can have them substantially bound in heavy board sides, covered with marbled paper, and leather backs and tips, for $1,00 per volume.

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RECENT AMERICAN PATENTS.

The following are some of the most important improvements for which Letters Patent were issued from the United States Patent Office last week; the claims may be found in the official list:—

Pulverizer.—This invention consists in a novel construction and arrangement of a rotary cutter or pulverizer, whereby the same is made to operate in the most efficient manner, and to overcome difficulties attending the rotary cutters hitherto used for pulverizing the soil. The invention also consists in a novel construction of a traction drum, on which the frame of the machine is mounted, whereby said drum is prevented from becoming smooth and inefficient by the adhesion of earth to it. The invention further consists in a novel application of caster wheels to the machine, whereby the same may be adjusted with the greatest facility, for the purpose of rendering the pulverizer operative or inoperative, as may be desired. Lemuel S. Fithian, of Absecom, N. J. (assignor to himself and John Young, of Joliet, Ill.), is the inventor

Millstone Pick.—This invention relates to a new and improved millstone pick of that class which are constructed of thin steel plates, and are fitted or secured in metal heads secured to a handle. The object of the invention is to obtain a simple and efficient means for securing the pick blades in the metal head, and one which will admit of the frame being readily adjusted, to compensate for grinding or wear, and which will also admit of the pick blade being readily removed from the head when necessary. Lemuel C. Stone, of Kingston, N. Y., is the inventor.

Cut-off.—This invention consists in the employment or use of a squirrel cam, applied in combination with the governor and with the main valve and cut-off valve of a steam engine, in such a manner that by the action of the cam on the rod of the cut-off valve the steam is cut off instantaneously, or nearly so, and the wire drawing of the steam is avoided; and, furthermore, the cam being in action only for a short space of time, leaves the governor free during the largest part of the stroke. It consists, further, in the application of a latch and sliding pin, in combination with the rods of the main valve and of the cut-off valve, and with a suitable cam, in such a manner that by the action of the latch the main and cut-off valves are locked open, leaving no liability to close the ports until the proper time arrives, and by the action of the ram and pin the two valves are disconnected instantaneously, allowing them to move in the same or in opposite directions, as occasion may require. J. H. Paine, of Hartford, Conn., is the inventor.

Hook and Eye.—The common hook and eye are very likely to become unfastened in case of any relaxation of the tension of the garment produced by the movements of the body or by other causes. Many modes of preventing this have been invented, but all have been more or less objectionable, on account of their making the hook and eye more complicated and more difficult to manufacture. The object of this invention is to make the fastening secure without making the hook and eye any more complicated, or increasing its cost, and to this end it consists in the combination of a bill broader than the bent portion of the hook, and an opening in the eye narrower than the bill of the hook, which prevents the withdrawal of the bill without bringing the hook to an oblique position relatively to the eye. J. P. Culver, of New York City, is the inventor.

English and American Coal Trains. — The *London Railway News*, in an article on the coal trade on the London and Northwestern Railroad, says:—"An ordinary load for one locomotive is thirty-five trucks, but even that immense weight is sometimes exceeded." Now, as a truck, according to the same authority, "holds between six and eight tuns of coal," it follows that thirty five trucks of eight tuns each make 280 tuns a maximum English load.

On the Philadelphia and Reading Railroad, last year, the loaded trains averaged 576 tuns of coal, or more than twice the number of tuns in a maximum train on the London and the Northwestern Railroad. The newer engines on the Philadelphia and Reading Railroad draw 150 cars containing about five tuns each, or nearly 750 tuns of coal on freight.

Admiral Porter's Report on the Monitors.

We extract from this officer's report such portions as relate to the monitor iron-clad batteries:—

"My late experience with the monitor class of vessels under fire at sea and in riding out heavy gales, justifies me in making a special report in the matter. I feel the importance of the Government's receiving accurate information in relation to a class of vessels about which there has been a difference of opinion. and of which we are building quite a number.

"My experience has been with the *Monadnock Saugus*, *Mahopac* and *Canonicus*, all vessels of some difference of construction, and built, I believe, by different contractors.

'The *Canonicus*, *Mahopac* and *Monadnock* left Hampton Roads on the 18th ult. The weather was quite rough, and at times the sea would go over the turrets and down the funnels; but I passed them while at sea, and they were making excellent weather of it. On asking their Commander afterward, how they got along, the answer was, 'Oh, quite well, sir; only a little damp.'

"The *Monadnock* is capable of crossing the ocean alone, (when her compasses are once adjusted properly,) and could destroy any vessel in the French or British navy, lay their towns under contribution, and return again, (provided she could pick up coal), without fear of being followed.

"On the 21st ultimo, it came on to blow hard from the southwest, and a very heavy sea commenced rolling in. The vessels are all anchored in thirteen (13) fathoms water, with a long scope of chain out. Most of the vessels dragged during the gale. The *Tuscarora* and *Juniata* put to sea (I think unnecessarily), while the monitors rode out beautifully. I was anchored quite near them, and witnessed their performances. I at first thought I had been imprudent and had unnecessarily risked the lives of officers and men, but I went to sleep the first night of the gale quite easy in my mind in regard to the monitors.

"I saw that they were making the best weather, and riding easier than any of the other vessels in the fleet. All the transports cut and ran, though I think that was quite unnecessary. After the gale I inquired of the Commanders of the monitors how they passed through the ordeal, and they seemed to think they got along very well. The smaller monitors, *Mahopac* and *Canonicus*, at times almost disappeared from view, and the Commander of the former vessel complained of discomfort, owing to the decks leaking, but the vessels were in no danger at the time.

"The Commanders of the monitors seem to feel quite at home and safe in them, and apprehend no more danger at sea than in any other kind of vessel. Commander Parrott, of the *Monadnock*, remarked he did not see any difference between her and anything else. The *Saugus* joined me after the first day's fight, off Fort Fisher, and was towed round from Norfolk by the *Nereus*, in very rough weather. The vessel leaked a good deal through her bows, and some uneasiness was felt for her on that account; but her seagoing qualities were spoken of as good. The difficulty was a mechanical one, and in no way detracts from the qualities of the vessel. There is no great amount of comfort on board these vessels at sea; that is conceded on all sides, but they are seldom at sea, and only exposed when making a voyage. This is the first time, I believe, that the monitors have ridden out heavy gales, in an open sea at anchor, though they have ridden out gales in Charleston Roads.''

Destruction of the Smithsonian Institute by Fire.

On Jan. 25th, the magnificent structure known as the Smithsonian Institute, at Washington, was destroyed by fire. The *Intelligencer* thus speaks of the catastrophe:—

"The fire originated in the loft above the picture gallery. Workmen had been engaged there in hanging pictures, and the room being cold, they put up a stove, and, it is supposed, ran the pipe into a defective flue, and thus caused the fire. The fire spread rapidly and soon the roof of the lecture room fell, driving out the firemen who were endeavoring to confine the flames to the picture gallery. The fire spread to other portions of the building. It was deemed prudent to remove the furniture from the east wing, occupied by Prof. Henry as a private residence, and also the stuffed birds and preparations from the taxidermist's rooms; but in the haste and from the narrowness of the passages much damage was done to the property so removed.

The library in the west wing and the residence of Prof. Henry in the east wing will be saved from the ravages of the flames. The museum on the lower floor is also safe, for the floor between it and the upper rooms is of brick and constructed so as to be fire proof.

The instruments and apparatus in the east wing were worth at least $10,000, and it is not yet known how many were saved.

Apparatus of Historic Interest Destroyed by the Recent Fire.

Among the articles destroyed by the disastrous fire at the Smithsonian Institute were all the chemical apparatus presented by Prof. Hare, a large magneto-electric machine, an electro-magnet, and set of apparatus illustrating the discovery of the vibration of Trevelyan's bars by galvanism, presented by Prof. Page. The magneto-electric machine was of peculiar construction, a full description of which is given in Vail's work on the American telegraph. Noticing its performances the author says;—"This machine operated Morse's telegraph in 1844 through 80 miles of circuit, makes an electro-magnet sustain 1000 pounds, and melts a platinum wire one-fortieth of an inch diameter."

Sir Wm. Armstrong's Present to Jeff Davis.

Among the many trophies captured at Fort Fisher was an Armstrong gun presented by the manufacturer, Sir William Armstrong, to Jeff Davis.

A soldier describing it says, "it is by all odds the handsomest gun I ever saw, being entirely of twist wrought iron, and mounted on a magnificent solid mahogany carriage."

Such a present is eminently characteristic of Sir William, who believes that all patent laws for protecting inventors' rights should be abolished. He thinks, probably, that one of his guns in the hands of Davis would not only contribute to kill Yankees, but would also aid towards destroying the patent laws.

American Nails in the British Provinces.

The *Iron Trade Circular*, of Birmingham, remarks:—"A hint to nailmakers reaches us from Vancouver and British Columbia, in a letter which says:—'I trust that the nail manufacturers have made some provision to remedy the defect I pointed out previously; for as new towns are continually springing up here, all of which are built of wood, fastened together with nails, a large and interesting trade exists; but so inferior are the English-made nails, that no carpenter will undertake any contract without being provided with American nails.'"

The Best Time to Prune Trees.—At the last meeting of the Farmers' Club there was a long discussion on pruning trees, by Dr. Ward, and Messrs. Ely, Carpenter, and Smith, and they agreed in opinion, as the result of their experience, that the best time for pruning is the summer when the trees are growing Trees pruned at that time heal more readily, and are less likely to be attacked by black blast, or otherwise injured, than if pruned in the winter.

Drilling Upward.—A machine has been invented in England for boring upward from tunnels, for the purpose of ventilating mines. We have not seen the machine, but it is described as working much the same way as augers used in boring salt and oil wells. The auger is spliced as the work progresses, and as the boring is upward there is no trouble about clearing the hole of chips, as they drop down as fast as made.

Ornamenting Iron and Steel.—Mr. Christian Weintraud, jun., of Offenbach, Hesse Darmstadt, has patented an invention, which consists in ornamenting, by drawing or otherwise marking on the surface of steel or wrought-iron, which must be first polished or bright, or "matted," any desired spots, pattern, or device, with boracic acid. The metal is then fired, and according to different temperatures so will the effects differ.

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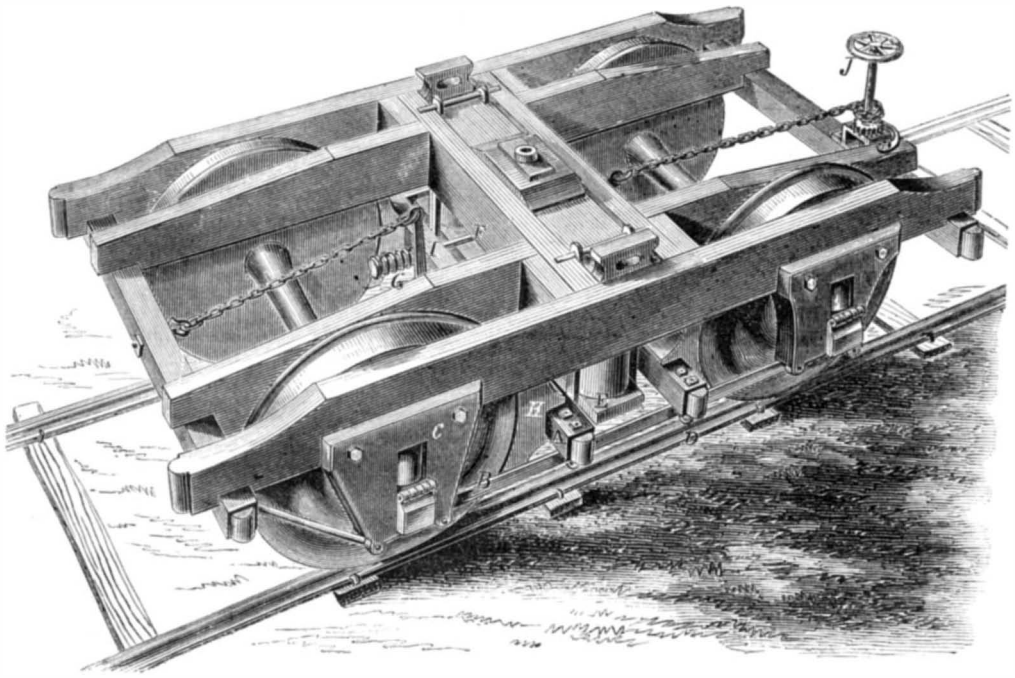
Improved Car Truck and Brakes.

Brakes, as ordinarily applied to railway car trucks, are a source of danger, for not unfrequently the sustaining irons break and let the beams down on the track, endangering the security of the train and passengers. In this improved railroad truck such disasters cannot occur, for even if the stirrup irons, supporting the brake beams from the car frame above, are entirely removed, the brakes themselves cannot drop down, as in the ordinary truck. Additional security is given the brakes by prolonging the ends of the beams, A, and affixing an iron bar, B, between the two pedestals, C, so that the beam ends rest upon it. There are also iron straps, D, in the ends of the beams, through which the bar, B, passes, thus preventing the beams from sliding endwise should they be broken in the middle. In the center of this truck frame there is a stout timber, E, over which rods, F, provided with springs, G, pass There is one of these rods at each end of the truck, and they also serve to sustain the brake beams, while the springs, G, keep the brake blocks, H, off the wheel, so that they are out of contact except when in actual use.



GOODNOW'S CAR TRUCK AND BRAKES.

The application of the brakes, or retarding power, to these trucks, puts the train under perfect control. Two levers, I, are used, and the hand wheel, J, is connected with one, while to the other a stationary chain, K, is fastened, which holds it to the truck frame. These two levers are also tied rigidly together at the bottom, under the beam, by an iron rod, so that when strain is applied to the first lever it will be communicated to the other by the rod before-mentioned, and both sets of brakes will be forced up against the wheels.

This brake was invented by W. G. Goodnow, and assigned to Goodnow & Wood, through the Scientific American Patent Agency, on October 18, 1864. For further information address D. S. Wood, Albany, N. Y.

EMPLOYMENT FOR DISABLED SOLDIERS.

It is to be regretted that full and accurate records have not been kept by the Government respecting soldiers and sailors discharged for disability during the war. The authorities have been lax in this particular. The system which was well adapted to our regular army in time of peace falls far short of the requirements of a great volunteer army in active service. A Bureau of discharge established at Washington, St. Louis, Cincinnati, and New Orleans at which men sent from the front could be re-examined and through which candidates for discharge should be sifted. might have saved thousands of perfectly able bodied soldiers to the government, and at the same time furnished statistics of the most interesting and useful nature.

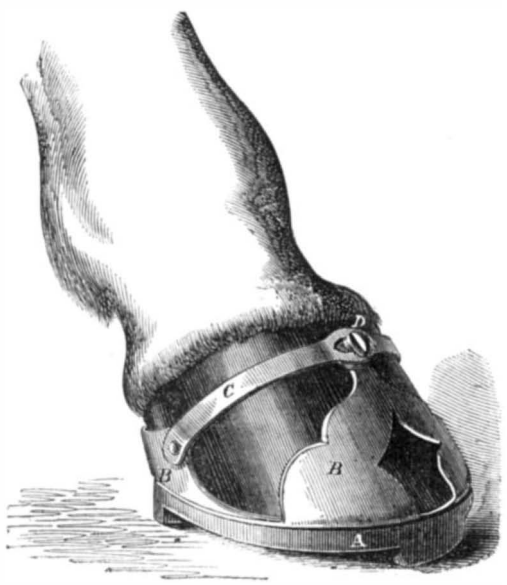
Although we have really no means of determining the number of men who have lost arms or legs, or suffered other injuries in battle, or even the number discharged by means of wounds, the fact that numbers have thus suffered and become unfit for future service and for ordinary employments, becomes more and more apparent. Col. Nott, who is acting as Secretary of the new "Bureau of Employment for Disabled and Discharged Soldiers and Sailors," at 35 Chambers street, gives us some data which future observations may confirm or modify. It appears that of the first two hundred applicants for employment registered at the Bureau, 63 per cent were discharged for wounds, 31 per cent on account of other disabilities and 6 per cent on the expiration of their terms of service. It also appears that 16 per cent of all the applicants have lost an arm, and 15 per cent have lost a leg, and nearly every trade seems to be represented among them.

A main noticeable feature is the small proportion of men "fit for service." It indicates very clearly that nearly all of our veterans who are not disabled re-enter the service. The next fact is the large proportion of men who have lost the use of arms or legs. Thirty-one per cent of all the applicants (in effect one-third) are of those permanently disabled groups. A new class of laborers is, therefore, to be provided for in one of two ways:—either by giving them work, or by charity.

We cannot consent to make paupers of our soldiers; of all others they are the first who deserve well of the country. Whatever employment is adapted to their condition should be set apart for them. It is indisputable that thousands of able bodied men are employed on work which should be transferred to the disabled. The Government offices, Navy Yards and Custom Houses can give permanent occupation to large numbers of these men as clerks, book-keepers, messengers, letter carriers, watchmen, &c. The action of the Government and the efforts of every individual employer are needed to co-operate in this field of furnishing employment to disabled soldiers.

CHITTENDEN'S HORSESHOE.

Very many horses have been maimed for life by the carelessness of farriers. Sometimes the evil is



caused by misfitting shoes, or by driving the nails in too far. In either case the result is the same, and severe losses have been the result of the mischief referred to. There is another feature about a shoe which is permanently attached to the horse's hoof. Humanitarians have urged that it is no more reasonable that a horse should retain his stiff, unyielding shoes, after a hard day's work, than his master, and that where the latter doffs his heavy traveling boots, the beast should have the same privilege, and the shoes ought to be removed when his day's work is done. It is argued in favor of this course that the comfort of the animal is not the only consideration, for, if the animal stood in his "bare feet," the floor of the stall would be preserved from injury, and wear much longer than when sharp iron came in contact with it; also that the shoe itself would be more durable, because it would not be worn except when in actual duty. By the disposition of the several parts of the shoe here shown, which is intended to be removed at will by any person, the hoof is preserved from injury, and diseases of that member prevented, by keeping them in a state of nature, or free from the boring, burning and cutting incidental to the present system of shoeing horses.

Whether these conditions are all obtained is more than we can say. The shoe shown is simple in construction and adjustment, and seems likely to fulfill the ends required of an article of this character.

In detail, it is a common shoe, A, with a strong metallic shield, B, at the front and rear. This is fitted to the hoof, and the whole is then retained in place by the metallic bands, C, one end of each fitting over a button, D, which holds them both in place, or allows the shoe to be taken off by simply turning the button on one side.

This horseshoe is the invention of Morgan Chittenden, of Danbury, Conn., and was patented on the 17th of October, 1864. For further information address him as above.

Revived Corks.

The attention of the French public has been called by M. Stanislaus Martin to the employment of refuse corks as dangerous to public health. It is the custom of the Paris scavengers to collect those which are brought down by the sewers, and sell them to persons who make it their business to revive them. If the corks are of unsightly shape they are recut; while, if containing holes, they are filled up with mastic, and then smeared with powder to give them a proper color. Such corks used only to be employed by the ink and blacking makers, but their low price (5s. 6d. per 1000) has of late induced retailers of bottled beverages to purchase them. Some of these corks may have been formerly used to stop bottles containing poisonous substances; for although a good cork is not permeable, a bad one, full of holes, may readily become the receptacle of particles of verdigris, carbonate of lead, arsenic, or an infinity of other poisonous substances, which may be more or less soluble in water, wine, beer, cider, vinegar, milk, or oil.—*London Grocer.*

Marine Railway around Niagara Falls.

Mr. Horace H. Day, the famous India-rubber manufacturer—now retired from that business, has shown us a plan which has been inaugurated by him for transporting vessels around the falls of Niagara on the American side. It is designed to place vessels with their cargoes in a portable lock filled with water, which is to be drawn by locomotives upon numerous rails.

The maximum grade is 120 feet to the mile, and the estimated cost is three and a half millions of dollars.

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AMENDMENT TO THE PATENT LAWS.—IMPORTANT TO PATENTEES.

The editorial letter from Washington published in our last number refers to an amendment now pending before Congress, designed to relieve a very large number of inventors who have failed to pay the balance of the patent fee—twenty dollars—within the six months as provided by law, thereby forfeiting their rights.

The language of the act of March 3, 1863, which requires payment of the balance fee within the six months after date of allowance, is peculiar. It provides that in default of said payment the invention shall become *public property as against the applicant.* The public acquire no rights in the invention as against another and subsequent inventor, leaving the original and first applicant only to suffer the consequences of not having paid the second fee within the time specified.

The rule of the Patent Office treats all such lapsed patents as judicially dead upon the record, and examiners are not allowed to refer to them under any circumstances, even though an application be made by another inventor for the same thing. Though this rule may be correct as based upon the language of the law of March 3, 1863, it nevertheless contravenes the plain intention of the statute of 1836, which requires that patents can issue only to the original and first inventor of the art, machine, composition or improvement. The same statute provides that whenever, in the Commissioner's opinion, two pending applications are adjudged to interfere with each other, that officer shall declare an interference, and require testimony with a view to determine the question of priority as between the applicants.

The amendment of 1863, however, conflicts with the law of 1836, inasmuch as it shuts off from this interference the unfortunate first applicant who has not paid up within the six months. Many might hastily jump at the conclusion that it would be serving an inventor right who thus failed to comply with the inexorable demands of the law; but we think no unprejudiced mind will thus reason, when a fair statement of the case is presented.

If an inventor wilfully neglect his duty as prescribed by the law, he is entitled to no sympathy, and ought not to ask for it; but the records of the Patent Office show most conclusively that there are hundreds of cases in which the applicant could not comply with the law. Many inventors justly plead inability to make the payment in time; some are entirely ignorant of the law on the subject, and for want of such information do not pay up in time; but it bears with peculiar hardship upon persons residing in foreign countries and upon those who are engaged in the military and naval service of the country. Inventors of this class are subject to all the changes and vicissitudes of the service, and are rarely ever stationed for a long time in one position.

There are many very aggravating cases, involving the interests of our brave soldiers, which appeal with great force for such relief as will be afforded to them by the bill now pending before Congress.

The act in question provides that an applicant whose patent has elapsed under the operation of the law of March 3, 1863, shall have a right to renew his application within two years after date of allowance, upon the payment of fifteen dollars, and to use the papers and model originally presented to the Patent Office. This we regard as a fair and equitable treatment of all such cases, and we trust that it will meet the approbation of Congress.

The bill has been carefully considered in all its bearings, and has received the unqualified sanction of the Hon. Commissioner of Patents. It now only awaits the action of Congress to become a law of relief. It is vastly important, however, that it should pass at this session in order to allow all such cases to be included within its provisions. If it be put over till the next Congress the term of two years, as provided in the bill for the renewal of applications, will have expired before favorable action can be had.

Inventors who are suffering under the operation of this law of limitation ought to write to their members of Congress to look after the bill, and not allow it to slumber for want of attention.

ARE BANK DEPOSITS CURRENCY?

Hunt's Merchants' Magazine, under its new management, exhibits a mastery of economic science which gives remarkable interest and force to its discussion of financial questions. In the last number is an article on The National Finances, by Hon. Amasa Walker, the several positions of which seem to us sound, with one exception. This is embraced in the sentence, "The bank currency of the nation, at the present time, reckoning the circulation at $250,000,000, and the deposits at $450,000,000, is $700,000,000."

The currency or money of this country at the present time is of two kinds. In the States lying on the Pacific it consists of flat disks of two metals, gold and silver. In the remainder of the country it is a mixture of metallic disks and notes, the metal being an alloy of copper and nickel, and the notes being partly those of the United States Government, and partly those of certain joint stock companies or associations of individuals, called banks. The managers of these companies have succeeded in so establishing their credit, that their notes are received by people in exchange for the most valuable property, and have finally come into use as money. This same credit induces people who have money on hand which they do not intend to use immediately, to leave it with some bank for safe-keeping. If the banks kept these deposits on hand in the form of money, it would be a portion of the currency of the country; but this is not the case.

Deposits are usually made with banks in the first instance in the form of notes. One trader sells to another $1,000 worth of merchandise on six months credit, the purchaser giving his note for the amount. The seller sends his note to the bank for discount; the interest is deducted, and the remainder is carried to the trader's credit as a deposit.

If the trader now buys goods for cash, he draws his check for the amount; the seller of these goods sends the check to his bank, where it is entered to his credit as a deposit, and after its passage through the clearing house it is charged to the drawer, diminishing his deposits to the same extent. This is the ordinary course of business.

It will be seen that bank deposits are simply ledger balances, being the records of the transfer and ownership of merchandise. There is no more propriety in calling them currency, than there is in calling a barrel of pork, currency.

If a bank has on hand any notes of other banks, those notes are money, or currency. But they are part of the circulation, and are included in the $250,000,000.

CORN HUSK FOR PAPER STOCK.

We are informed that the process for making paper from corn husks, of which so much has been said in the SCIENTIFIC AMERICAN, is about to be tried here on an extensive scale in a short time. If successful, printing paper especially is to be largely manufactured.

Corn husks have doubtless been fed out to cattle universally this winter, but expensive as hay is it is questionable economy to do so now when there is a prospect of obtaining a high price for the husks before spring. We therefore suggest that our agricultural readers carefully husband their stock of this staple, for a time at least, as the demand for it is likely to make it much more valuable than it is in the shape of cattle feed.

We sincerely hope and believe that the preliminary trials with corn husks for paper stock will prove to be what it has been represented, and further, that energetic measures will be taken to put the manufacture in market, for newspaper publishers have no heavier tax in their business than the price of printing paper.

It is stated that proprietors of the leading papers in this city have secured the right to make paper from this substance, and farmers are requested to address D. A. Craig, General Agent of the Associated Press, New York City, in reference to any quantity of corn husks they may have to dispose of.

HOT BEARINGS.

Detention and delay of steam vessels by hot bearings is not an uncommon occurrence. We read in reports of trial trips "the ship was delayed some hours by hot bearings." These few words convey no idea to the uninitiated, of the engineer's anxiety, the impatience of the captain and sailing officers on such occasions. There are some screw steamers out of this port which have an inch and a half stream of water constantly running on the main shaft-bearing. Such nastiness as this creates is beyond expression. Those who go below in the performance of their duties are agreeably (!) surprised by warm jets of greasy spray, and besmeared from head to foot. The bilge pumps are forever going, or the bilge injection is kept wide open to free the ship from the water. No lubrication takes place, for the oil is washed out as fast as it is poured in, and the main bearing has little more oil than the stern bearing, which runs under water.

Aside from faults of design which are often the sole cause, there are others which relate to mere manipulation or adjustment which may be here alluded to. Bearings often heat from being what is technically called "collar bound," or so tight sidewise that there is no motion.

Paddle wheel steamers rolling in a sea-way invariably heat and cut at the collars when the brasses are tighter at the point designated. When cutting once begins the fine metal abraded gets in and tears up the whole surface, rendering it hot in a short time. Badly fitted boxes also heat quickly. There will always be one part of the bearing where the chief work is done. A horizontal engine bearing wears chiefly at the sides, and chocks are provided for the purpose of taking the brasses up at these points. Vertical engine bearings wear at the bottom and top, and the labor is always in the direction of the stroke of the piston. Thus the brasses and bearings are continually wearing oval, or out of rotundity, and have to be chipped off to bring them down. When heating is not caused by defective adjustment, and is simply a fault of design, it is often of advantage to "doctor" the lubricant, and for this purpose blacklead and oil are useful. Sulphur and oil are also employed, and many engineers advocate the use of soapstone finely pulverized. Blacklead and tallow is also used for heavy bearings. All of these mixtures are nasty, and are chiefly valuable for their heavy body. Sulphur possesses no refrigerating power on a hot shaft, whatever it may do to the human body Blacklead has a certain smoothness which is valuable, and there is virtue in tallow. There is still an-

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other agent which has good qualities but it is rather dangerous to use indiscriminately. Quicksilver possesses the quality of imparting a smooth, greasy gloss to the roughest bearings. We have seen badly cut shafts very much inproved by the use of quicksilver; so that although the ruts still remained they were silvered over, and the bearing was as good as new. On brass boxes, however, this substance should be used with great circumspection, for it forms an amalgam, or combines, so that the brass is rendered softer at the surface, and is quickly worn away. Steamers that race sometimes use mercury freely in their bearings, though the bad effects that follow are not apparent until some time after.

A shaft that is too slack in its box will heat; this may occur from the violent and sudden contact of the two parts which causes the metals to come in contact without the intervention of oil. It very often happens that all adjustment is in vain; that all the doctoring and cold water that can be applied are useless. In such cases it is advisable to change the composition of the brass box, by substituting a harder or softer one as the case may be.

The heating of a brass or bearing is a sure sign that there is some defect which ought to be remedied. Unequal expansion of the engine framing causes it, as well as being keyed too tightly. Experiments made by a French engineer proved that up to 6000 pounds on the square inch no heating took place provided the bearing was well oiled and in line. The number of square inches in a large bearing give a very great sum total in pounds on the whole surface and when heating occurs it detracts seriously from the power of the engine.

INVENTION PERPETUAL.

There is a moral grandeur in the progress of invention which strikes a reflecting person forcibly. The spectacle of the weekly departure of models from this office, to be forwarded to Washington, is one of great interest. It is not merely the presence of a hundred or more inanimate machines, mere ingenious combinations, which causes these sensations; but the fact that through them the material interests of society are very greatly enhanced.

It would be puerile to represent every inventor solely as a public benefactor, with no thought beyond the welfare of mankind in general. Invention with most persons is a calling through which they get food and raiment; but those who originate and carry out useful improvements are accessories after the fact, in legal phrase, and as much entitled to public respect and remembrance as the greatest philanthropist.

It is related that a clown once stood beside a rapid stream, patiently waiting until the water had run out, so that he might pass over dry shod. If this traditionary personage should visit this office in the flesh he might stand agape with wonder and wait in vain until the shelves were bare of inventions; he might linger tediously while the expressmen bore in their parcels, in the hope that they would come no more; he might shuffle from one foot to the other, in the vain expection that ere long these inventors would cease bothering his sight with the long train of their ideas in tangible forms. So long as the river runs will the inventions come forth. So long as man is man his mind will be busy, and there will be no stop or check in the improvements he devises.

In the summer time, or in harvest, with the falling of the leaf or the budding of it, all is the same, and instead of growing less there is an appreciable increase in the number of applications for patents. It is well that this is the fact, for by the exertions of the class in question hundreds have been added to our army, to our navy, to the field, the factory and the store.

DRY PRINTING.

We mentioned last week, in our editorial correspondence from Washington, that some eighty hydrostatic presses are employed in printing the fractional currency. On the 19th inst. there was a discussion on the subject in the House of Representatives, when Mr. Garfield made the following remarks:

"In regard to the dry-plate printing, to which the gentleman has referred, the committee did report that the machinery was very heavy and expensive, that the experiment had not yet been completed, and that they could not recommend the system on the score of economy. It seemed to us to be an expensive experiment and one of doubtful success. But since that time the experiment has proved highly successful. I think there can scarcely be found an instance of so marked a success in any branch of mechanical ingenuity as this experiment in dry-plate printing. If the gentleman will visit the Treasury Department he will find that printing is there executed far faster by this method than by the old method; and not only faster, but far better. The printing is executed in such a way as to afford almost an absolute security against counterfeiting. Within the past few months one of the most accomplished engineers of England has visited the printing establishment of the Treasury Department, and he declares the printing machinery now in use there to be a master-piece of skill in mechanics. And I am informed to-day by a gentleman on this floor that Professor Agassiz, who has witnessed the operation of that machinery within the past week, pronounces it one of the wonders of the age—one of the marvels of mechanical science."

In ordinary copper or steel plate printing the paper is moistened in order to soften it before it is laid on the plate. This renders necessary a drying and pressing process after the printing. The object of printing the paper dry is to save all subsequent manipulation, but to print it dry, very powerful pressure is required, and this is furnished by the hydraulic press.

ISSUED FROM THE UNITED STATES PATENT-OFFICE

FOR THE WEEK ENDING JANUARY 24, 1865.

Reported Officially for the Scientific American.

☞ Pamphlets containing the Patent Laws and full particulars of the mode of applying for Letters Patent, specifying size of model required and much other information useful to inventors, may be had gratis by addressing MUNN & CO., Publishers of the SCIENTIFIC AMERICAN, New York.

45,962.—Hoisting Machines.—Charles Abel, New York City:

I claim the construction and use of the worm wheel, D, with its connected wheel, E, and the worm screw, C, in combination with the pulley, A, substantially as and for the purpose described.

45,963.—Shutter Bolts.—Edward Andrews, Palo Alto, Pa.:

I claim the combination and arrangement of the bolt, B, the latch, D, lever, F, and spring, E and J, when used for the purpose herein fully described.

45,964.—Tapping Water Pipe.—Phineas Ball, Worcester, Mass.:

I claim, first, The combination of the clamping irons, H H', with the pipe, A, tap holder, D, and tap, c, substantially as and for the purpose described.

Second, The combination of the clamping iron, H, with tap holder, D, and tap, C, substantially as and for the purposes described.

Third, The combination of the packing, I, with pipe, A, tap holder, D, and tap, C, substantially as and for the purposes described.

45,965.—Horse-power Elevator and Excavator.—Stephen T. Bishop and Andrew Stevely, Fond du Lac, Wis.:

We claim, first, The combination of a tread horse-power, with an endless chain excavator and elevator, substantially as set forth.

Second, We claim the adjustable frame, E, or its equivalent, in combination with the tread horse-power frame, substantially as specified.

Third, We also claim the machine, constructed and arranged substantially as described.

45,966.—Horse-power Elevators and Excavators.—Stephen T. Bishop and Andrew Stevely, Fond du Lac, Wis.:

We claim, first, So constructing and arranging a horse-power elevator and excavator as to render the machine movable with the horse upon the same, substantially in the manner and for the purposes set forth.

Second, We also claim the above-described arrangement of the wheels, U and V, in combination with the two sets of wheels, R and S, substantially as specified.

45,967.—Horse-power Elevator and Excavator.—Stephen T. Bishop and Andrew Stevely, Fond du Lac, Wis.:

We claim, first, The combination of the hook, L, with the bars, I, and the endless chain, substantially as set forth.

Second, We claim the use of the bar, I, for attaching the hooks or buckets, or both, to the endless chain, substantially as described.

Third, We claim the arrangement of hooks upon one part of the bar, I, and at the same time putting a bucket or buckets upon the other part or end of the bar, substantially as described.

Fourth, We also claim the arrangement of the hooks and buckets alternately, upon successive bars, I, substantially in the manner and for the purpose set forth.

45,968.—Horse-power Elevator and Excavator.—Stephen T. Bishop and Andrew Stevely, Fond du Lac, Wis.:

We claim the adjustable frame, C, in combination with the horse power, substantially as set forth.

Second. We claim the arrangement of the ratchet wheels as shown in Figs. 1 and 3, in combination with the crank, N, and frame E, substantially in the manner and for the purposes set forth.

Third, We claim the combination of the ratchet wheels and crank, N, with the ratchet bar, Fig. 3, substantially in the manner and for the purposes described.

45,969.—Looms.—Wm. Breitenstein, New York City:

First, I claim the arrangement and construction of the sliding bars, C C', provided with suitable arms at their ends forming the shuttle holders, and operated in the manner and for the purpose substantially as set forth and described.

Second, I claim the construction of the shuttle holders, and the arrangement of the arm, m, operated by a spring, o, and acted upon by the lever, G or G', in the manner and for the purpose described

Third, I claim the arrangement and combination with a shuttle holder of the shield plate, F, in the manner and for the purpose set forth.

Fourth, I claim the sliding bar, H, in combination with the levers, G G G' G', constructed and operated in the manner and for the purpose specified.

Fifth, I claim the arrangement of the hook levers, N N', with their springs, r r', attached to sliding bar, H, in combination with springs, s s', attached to the breast beam, B, and acted upon by the arms, p p', of the sliding bar, C C', for the purpose of operating said sliding bar, H, in the manner substantially as set forth and described.

45,970.—Stone Gatherer.—P. S. Brewster and C. M. Hines, Lime Hill, Pa.:

We claim the pivoted bar, C, provided with gathering fingers, c, and operated by means of the bail, H, levers, F, and rods, E G, substantially in the manner herein described.

Second, We claim the platform, E, in combination with the lock bar, A' a', spring, a2, and plate, D', when the whole are employed in conjunction with the gatherers, C c, in the manner and for the purposes explained.

Third, In combination with the gatherer, C c, we claim the rollers, B B, extending across the machine to raise the fingers over stones too large to be lifted by them, substantially as set forth.

45,971.—Corn Planter.—George Bunch, Grand River Township, Mo., and James A. Price, Breckenridge, Mo.:

I claim the sliding handle, I, and sliding bar, H, connected together and applied to the frame, A, and shaft, D, substantially as and for the purpose herein set forth.

[This invention relates to a new and improved corn planter, of that class in which the seed-dropping mechanism is operated manually by the driver while walking behind the machine and guiding the same.]

45,972.—Sewing Machines.—Caleb Cadwell, Waukegan, Ill.:

First, I claim the slide, E', having a groove, e', to actuate the pin, f', on the thread catcher, F f, which guides the thread around the shuttle, substantially as described.

Second, I claim the pivoted bar, P, for taking up the slack thread, when operating in combination with the flipper, P', and projection, k', in the manner herein set forth.

Third, I claim the tension device, Q2 Q4 Q5, and the pin, Q2, for the spool, all mounted upon the spindle, Q3, on the arm, D, so that they may be removed and replaced at will.

Fourth I claim the adjustable block, h3, and circular block, H2, in combination with the notched aperture for imparting a variable movement to the feed surface, H, the whole being operated by means substantially as herein described.

Fifth, I claim the combination of the circular blocks, H7 H8, the former, H7, being moved vertically by turning on the latter, H8, so as to raise and lower the feed surface, in the manner and for the purpose set forth.

Sixth, I claim the thread-winding apparatus, R R1 R2 R3 r, operating in connection with a spring, S, whereby it is held down to work in connection with the driving wheel, B, or retained out of contact therewith, as stated.

45,973.—Means of Working Ship's Pumps.—Ansel Cain, Holyoke, Mass.:

I claim operating the pumping apparatus of a ship or vessel by means of an oscillating weight, in combination with the mechanism described, the whole arranged substantially as set forth.

45,974.—Duster for Brick Machines.—Cyrus Chambers, Jr., Philadelphia, Pa.:

First, I claim applying sand or dust to the surface of undried bricks, in a chamber in which those materials, or either of them, are kept in suspension by mechanical means.

Second, Passing bricks as they come from a brick machine through a box or chamber in which sand or dust are kept in suspension by mechanical means, substantially in the manner and for the purpose described.

Third, The use in a dusting apparatus of the cones, P, constructed and operating substantially as described for giving direction to currents of sand or dust, for the purpose specified.

45,975.—Railroad Car Brakes.—J. H. Champlin, Essex, Conn.:

I claim a friction block for railroad car brakes, formed from stone or its equivalent, combined with and made adjustable by means of the screws, a a, in the case, D, and arranged to operate substantially in the manner and for the purpose specified.

45,976.—Combined Seed and Potato Planter.—Otis N. Chase, Boston, Mass. Ante-dated January 8, 1865:

First, I claim the combination and arrangement of the toggle lever, d, and the frames, A and C, with one or more plows, substantially as described.

Second, I claim the projections represented by the knives or hooks, f f, etc., in combination with the stripping slot, i, or its equivalent, substantially as described, for the purpose set forth.

Third, I claim the combination and arrangement of the springs, j j, inclined plane, g, and seed box, H, with the projections, as represented by the knives or hooks, f f, etc., substantially as described, for the purpose set forth.

45,977.—Material for the Manufacture of Buttons, Handles for Knives, and other purposes.—Lucius E. Chittenden, Washington, D. C.:

I claim the manufacture of the articles above named, and the use in whole or in part for such manufacture, of the interior or nacreous portion of the shells of the fresh-water molluscous animals of the United States and North and South America, substantially in the manner above described, or in any other, substantially the same, which will produce the internal result or effect.

45,978.—Leather-channeling Tool.—Elliott H. Crane Jonesville, Mich.:

I claim the combination of the adjustable gage, G, with the shank, A, substantially in the manner herein shown and described.

I also claim the combination of the block, C, and cutter, B, with the shank, A, substantially as herein shown and described.

I also claim the combination of the cutter, F, with the cutter, B, block, C, and shank, A, substantially as herein shown and described.

I also claim the combination of the gage, G, with the block, C, cutters, B F, and shank, A, substantially in the manner herein shown and described.

[The object of this invention is to facilitate the cutting of V-shaped channels upon the edges of harness straps, boot and shoe soles, and upon all kinds of leather articles where channeling is required. The inventor calls it the "Improved Universal Channeler," because it can be readily adjusted so as to cut channels on different lines. It is a good improvement.]

45,979.—Hooks and Eyes.—John P. Culver, New York City:

I claim a hook and eye, combining the widening, e, of the bill of the hook with the narrower opening, b, of the eye, substantially as and for the purpose herein specified.

45,980.—Method of Attaching Handles to Cross-cut Saws.—Charles Disston, Philadelphia, Pa.:

First, The handle, A, its ferul, c, and strips, b, the key, F, and self-adjusting plate, D, the whole being constructed and arranged for attachment to the end of the saw, substantially as described.

Second, The self-adjusting plate, D, hung to the strips, b, and having projections, e e, adapted to notches in the edge of the saw, all as set forth

45,981.—Scroll Saws.—Wm. H. Doane, Cincinnati, Ohio:

First, I claim the combination of the devices A B C a b, the same

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being adapted for and constituting a portion of a scroll sawing machine or sawmill, substantially as herein set forth.

Second, The combination of the tubular sleeve, C, key, c, screw, d, recessed or tubular shank, e, and guide stock, D, substantially as and for the purpose set forth.

Third, A tubular foot stock, D, with a guide holder, D', on its lower end, the said holder being constructed and having guides fitted upon it, substantially as and for the purpose set forth.

Fourth, The combination of the tubular sleeve, C, the stock, D, feather, c, and set screw, d, substantially in the manner and for the purpose described.

Fifth, The employment of a door, E, or its equivalent, in combination with a foot stock, D D', substantially as and for the purpose described.

45,982.—Joining and Fitting Corners of Soap-stone Stoves.—Porter Dodge, Perkinsville, Vt.:

I claim, in combination with the grooved soap-stone slabs, A, the iron or metal corner or angular plate, B, substantially as and for the purposes described.

I also claim, in combination with the grooved soap-stone slabs, A, and angular plate, B, the cap, C, substantially as and for the purpose specified.

45,983.—Revolving Fire-arms.—Wm. C. Dodge, Washington, D. C.:

I claim, first, The sliding lock bolt, q, arranged in bridge piece, p, as shown and described, whereby the parts can be locked automatically, and can be unlocked and swung over by a single application of the thumb, and the whole operation performed by the use of one hand only.

Second, Hanging the cylinder on the tubular bolt, g, or hollow journal, h, when connected by the frame at one end only, whether at the front or rear.

Third, supporting the detached end of the cylinder by the projection, i, and groove, j, substantially as specified.

Fourth, Locking the projection, i, in place by the latch, k, or its equivalent, substantially as shown and described.

Fifth, So arranging bolt, l, and latch, k, that both can be operated simultaneously, and by a single movement.

Sixth, I claim constructing and arranging bolt, l, and latch, k, in such a manner as to permit the front and rear portions of the frame to be locked automatically, as they are swung into position for firing, whereby the use of one hand only is required in the operation.

45,984.—Elastic Studs for Doors.—A. Eliaers, Boston, Mass.:

I claim, first, My improvement in the construction of doors, French windows, etc., which consists in the use of two or more elastic studs or buttons, working or rubbing against each other respectively, in the ends or edges of the swinging, sliding, or otherwise movable part, and the stationary rabbit or jamb, as described.

Second, The combination of the elastic studs or buttons, operating together, as described, and one or more elastic studs or buttons placed in the rear of the first set of studs or buttons, the whole serving to prevent noise and to hold in position, as set forth.

45,985.—Explosive Shells.—Edwin Estabrook, Jersey City, N. J.:

I claim the plane, or nearly plane faces, B1 B2, etc., on the interior of an explosive shell, arranged relatively to each other, in the manner and so as to produce the effect herein set forth.

45,986.—Fuse for Shells.—Edwin Estabrook Jersey City, N. J.:

I claim the employment in explosive shells of a fuse plug, adapted to collapse and crush by the action of the exploding charge, and to stop the escape of gas through the fuse plug, substantially as herein set forth.

45,987.—Cultivator.—J. W. Fawkes, Decatur, Ill.:

I claim the frame, E, applied to the draught pole, C, as shown, in connection with the foot levers, H G, arranged with the frame, to admit of the latter being operated as and for the purpose specified.

I also claim the pivoted plow standards, J, connected to segments, M, by bars, L, and links, J. in connection with the wooden pins, l, in the segments, all arranged substantially as and for the purpose set forth.

I further claim providing the segments, M, with handles, N, in connection with straps, O, on the frame, E, as and for the purpose set forth.

[This invention relates to a new and improved cultivator for plowing those crops which are grown in hills or drills, such as corn, potatoes, etc.]

45,988.—Gang Plows.—Wm. H. Freeman, Bloomfield, Iowa:

I claim, in combination with the stationary frame, A, the hinged plow beam or beams, F, and levers, G I and H, for the purpose of adjusting the hight as well as the inclination of the plows, substantially in the manner and for the purposes described.

45,989.—Piston Packing for Pumps.—Dwight B. Fuller, Buffalo, N. Y.:

I claim the combination of the follower, E, elastic disk, G, and leather bonnet, H, for the purposes and substantially as described.

45,990.—Washing Machine.—Squire Gambell, Otisco, N. Y.:

I claim the oscillating suds box, A, provided with the horizontal slats, g, and wash board, F, in combination with the fixed or stationary dash board, E, all arranged substantially as and for the purpose set forth.

I further claim the pivoted bar, G, with upright lip, K, attached, in connection with the projections, I, one or more, on the exterior of the suds box, for the purpose specified.

[This invention relates to a new and improved clothes-washing machine, and it consists in the employment or use of a suspended oscillating suds box, of semi-cylindrical form, in connection with a fixed or stationary dash board within the suds box, and a dash board attached to the suds box, and with or without a wash board, being arranged in such a manner as to operate very efficiently and without injuring the clothes.]

45,991.—Apparatus for Desulphurizing and Amalgamating Ores.—Eli P. Gardner, New York City:

I claim, first, The form and construction of the receiving and operating vessel, F, by which it is to be adapted to the uses and purposes required and designed, as above described.

Second, I claim the vertical shaft and its attachments of pins and revolving perforated diaphragm plate, combined, arranged and operating within the vessel, F, in the manner and for the purposes described.

Third, I claim the combination and arrangement of the operating vessel, F, the feed pipe and endless screw, I K, and the eduction or discharge pipe, P, and the rotation of the shaft and attachments, operating as described, so as to effect a continuous and uninterrupted operation of the process without stopping to charge or discharge the matter under treatment.

Fourth, I claim the combining and arranging the vessel, F, and the apparatus connected with it, and its contents with the washing tub or condenser and separator by means of educting pipe, P, and water pipe, Y, operating together as described.

Fifth, I claim desulphurizing the dust and dissolving the sulphur therein contained by subjecting the same to treatment with heated mercury, in a vessel in which the atmosphere or external air is admitted with the pulp, and uniting the fumes of the mercury with the fumes of the sulphur as they pass off within a vessel arranged, constructed and operating as described.

Sixth, I claim the construction of the water trough in the head of the operating trough, provided with a supply and discharge pipe for keeping cool the head and stuffing box, constructed and arranged and operating as described.

45,992.—Hay Spreaders.—W. C. Gifford, Jamestown, N. Y.:

I claim, first, The draught pole or thills, D, provided with a series of holes, d^n, and operating in combination with the pins, d, loops, b b', and cross bars, c c', of the frame, A, in such a manner that the same can be readily taken out and changed, or lengthened or shortened, as may be desirable.

Second, The combination of the tilting frame, F, with the reel, E, and chain, h, substantially as and for the purposes shown and described.

Third, The hand lever, G, in combination with the belt, i, and tilting frame, F, applied as herein set forth, so that by touching the hand lever the belt and lever combined will raise or lower the frame.

Fourth, The serrated bar, m, and catch, m', in combination with the lever, G, and belt, i, as and for the purposes specified.

Fifth, The rakes, H, provided with teeth, p p^4, and applied to the reel, E, in combination with the chains, p', spring stops, q, and cam, q^3, or their equivalents, constructed and operating substantially as and for the purpose shown and described.

[This invention relates to certain improvements in machines for turning and spreading hay, which act on the hay by means of a revolving reel, the rails of which are provided with suitable teeth to take up, turn and spread the hay as the machine is drawn over the field.]

45,993.—Grain Separator.—Horace N. Goodrich, Aurora, Ill.:

I claim, first, Providing the hopper with the feed-regulating boards, B, substantially as and for the purpose specified.

Second, The stationary strip or feed-regulator, E, when constructed and operating as and for the purposes set forth.

Third, The gang of series, F, with two or more of the sieves in the gang adjustable, and provided with the feed-regulator, E, substantially as and for the purpose herein described.

Fourth, Providing the shoes, G, with the grooves, I, so running into each other that a sieve or screen can be changed to different angles of inclination without being removed from the shoes, substantially as and for the purpose set forth.

45,994.—Cask for Preserving Beer, Etc.—Jacob Haege, Shiloh, Ill.:

I claim the combination of the piston, G, and its screw, c, with the plates, x x', and packing, F, substantially in the manner herein shown and described, so that by revolving the said piston rod the periphery of the piston will be expanded or contracted, all as specified.

The employment of the ratcheted nut, I, in combination with the screw piston rod, G, and piston, E, substantially as herein shown and described.

The construction of the plate, x, with cavities to receive the screws, substantially as and for the purpose herein shown and described.

[The object of this invention is to preserve beer, wine, and all kinds of juices and liquids in a fresh state, by preventing the contact of air with the said substances. This is accomplished by means of an exhaustible plunger, which fits the beer barrel or receptacle, the plunger being arranged to rest upon the surface of the beer, and to fall as fast as the beer is drawn.]

45,995.—Plows.—John Hanes, Polkville, Ky.:

I claim forming the plow stock; that is the curved front bar, b, ground bar, a, and brace, c, in one piece, in combination with the manner herein described and shown of adjusting the same to the beam, B, and handles, R, through the intermediary of the brace, P, and crop bar, W, substantially as set forth.

45,996.—Sap Spile.—Mark Hays, Worcester, Mass.:

I claim a tubular sap spile, provided or formed with a screw to screw into the tree, a circumferential groove extending wholly or partially around the spile to receive the handle of the pail which receives the sap, and a square, b, to receive a wrench to screw the spile into the tree, substantially as herein shown and described.

[This invention relates to a new and improved tube for conducting the sap from sugar maple trees into a pail or vessel prepared to receive it.]

45,997.—Straw Cutter.—Clark R. Hewett, Waupun, Wis.:

I claim, first, The combination of the rotary knives, L L, hub, K, braces, I I, stationary knife, E, and feed roller, c, c', all constructed, arranged and operating substantially as and for the purposes specified.

I also claim the adjusting of the knife, E, by means of the sliding wedge, F, arranged substantially as and for the purpose specified.

I further claim the spring, g, when applied to the knife, E and used in combination with the rotary knives, L L, substantially as and for the purpose set forth.

[This invention relates to a machine for cutting straw, hay, etc., for fodder, and it consists in the use of two feed rollers and an adjustable stationary knife, in connection with rotating knives, all constructed and arranged to operate so that fodder may be cut with rapidity and with but a moderate expenditure of power.]

45,998.—Turn-down Enameled Paper Collar.—James H. Hoffman, New York City:

I claim the new article of manufacture herein described constituting a turn-down or folded collar, made and finished substantially in the manner and for the purpose set forth.

45,999.—Machine for Folding Paper Bags.—Ellis A. Hollingsworth. South Braintree, Mass.:

I claim the combination of the stretchers, K K, or their mechanical equivalents with the leaves or flaps, g g, the whole being so as to operate together substantially in manner, and for the purpose or objects described.

And in combination with the two leaves, g g, and their elevating mechanism as described, I claim the opening bars, h h, applied to the leaves and the posts substantially as and so as to operate as set forth.

46,000.—Rear Sight Base for Fire Arms.—F. W. Howe, Providence, R. I.:

I claim the employment of a band made of two parts and fitted to a recess or groove in the outer surface of the barrel and stock, and secured as described in combination with the barrel, stock and rear sight as described, and for the purpose set forth.

And I also claim the combination of the said band made in two parts, and fitted to a recess or groove in the barrel and stock, and secured as described, in combination with the back strap swivel, as described and for the purpose set forth.

46,001.—Horse Rake.—Edward Huber, Kelso, Ind.:

I claim the spring or elastic plates, G, attached to the handles, F F, and provided with the projections d, e, in connection with the plates, H, on the teeth of the revolving rake head, D, the handles being connected by pivot bolts to pendants, B, on thills, A, and all arranged to operate in the manner substantially as and for the purpose set forth.

[This invention relates to a new horse rake of that class which are provided with straight teeth, and arranged so as to revolve in order that they may discharge their load.]

46,002.—Vegetable Cutter.—F. Hullhorst, Freeport, Ill.:

I claim the combination of the changeable feed boxes, H d I and J f f, with the cutting wheel, D G, and casing, A, all arranged to operate as specified.

[This invention relates to a new and improved machine for cutting vegetables of various kinds both for family use and for fodder for stock.]

46,003.—Bread Cutter.—F. Hullhorst, Freeport, Ill.:

I claim the curved slot, G, in the plate, H, attached to box, A, in connection with the knife, D, arranged in connection with a slide, lever, pawl and rack, or their equivalents to operate the sliding bottom, B, substantially as and for the purpose specified.

I also claim the adjustable plate, O, when applied to the device to operate in connection with the bar, N, on the bolt, F, of the knife, D, substantially as and for the purpose set forth.

I also claim the guide plates, C C, in combination with the knife, D, and slotted plate, H, for the purpose specified.

I further claim the adjustable bar, N, on the bolt, F, of the knife, D, in connection with the crop head, M, at the end of the slide, I, substantially as and for the purpose set forth.

[This invention relates to a new device for cutting or slicing bread, and consists in a novel arrangement of a knife, knife-guide and a feeding device, all arranged in such a manner that the bread, as the knife is operated, will be fed to the latter and cut into slices of the required thickness, the knife at the same time operating with a drawing cut.]

46,004.—Screw Propeller.—Fritz Jacob, New York City:

I claim the screw propeller constructed with hollow bow-ended blades, B, of the form herein shown and specified and for the object set forth.

[This invention consists in a screw propeller with hollow wings arranged in such a manner, that each wing forms a channel through which the water is forced in a direction parallel to the shaft on which the screw revolves, while at the same time the faces of the wings act like the blades of screw propellers of the ordinary construction, and by these means the effective surface of the screw, and, consequently, its propelling power are considerably increased.

46,005.—Apparatus for Separating Metallic Filings.—Julius Johnson, Baltimore, Md.:

First, I claim the combination of temporary magnets fixed upon a shaft which is made to traverse back and forth as described, with a traveling apron for carrying the filings to be cleaned substantially as above set forth.

Second, I also claim breaking and re-establishing the circuit between an electrical battery and a series of temporary magnets automatically by means of the cams, m the vertical rack and the lever, i, under a mode of operation substantially such as and for the purpose above described.

Third, In combination with the aforesaid lever, c' rack 14 and temporary magnets, p, I further claim the separate reservoir, U, and inclined partition, V, for the reception of the iron and steel filings as explained.

Fourth, I also claim the sliding sock shaft, s, the connecting rods, e, cranks, f, and shaft, g, in combination with the gear wheel, 7, substantially as described.

Fifth, I also claim the combination of the segment gear wheel, 5, pinion 4, and shaft 13, for imparting intermittent rotation to the apron, c, as explained.

Sixth, I also claim operating the rack by means of the lever, i, and the pin, h, on the wheel, 7, substantially as described.

46,006.—Method of Oiling Wool.—B. H. Lightfoot, Philadelphia, Pa.:

I claim, first, The application of prepared petroleum or other oily hydro-carbons to the oiling of the wool.

Second, The application to the oiling of wool of oily hydro-carbons, in combination with olein or lard oil, or other equivalent material.

46,007.—Stove-pipe Damper.—Edward Mackevitz and Wm. Frankfurth, Milwaukie, Wis.

I claim, first, The arrangement within a drum or a section of a stove pipe of the fixed and moveable partitions, C, D, and the fixed and moveable partitions, C', D', in two series, one above another, substantially as above described.

Second, We also claim weighting the moveable partitions, D, D', substantially in the manner described.

[This invention consists in a novel construction and arrangement of fixed and rotating partitions within a section of stove pipe whereby the products of combustion and heated gases from the fire are caused to take a circuitous path in escaping to the chimney so as to impart their heat to the sides of the pipe.]

46,008.—Photographic Card Mount.—T. Mayhew, Poughkeepsie, N. Y.:

I claim a photographic card mount, the surface of which is partially or wholly covered with gum or other suitable cement, substantially as and for the purpose set forth.

[This invention relates to a photographic card mount which is wholly or partially covered with gum arabic or other suitable cement or mucilage in such a manner that when the picture is wet and placed on said card, it will readily adhere thereto and the time and labor necessary in pasting the picture on the cards, and the danger of soiling them during this operation, is materially reduced.]

46,009.—Horse Rake.—E. C. Martin, West Liberty, Iowa:

I claim the combination with a revolving rake, A B B', of the flexible metallic supports, D D', attached at one end and so arranged as to move in contact with the ground behind the rake head, substantially as and for the purpose explained.

46,010.—Lantern.—Geo. C. Merrill, Chicago, Ill. Antedated Jan. 14, 1865:

First, I claim operating the wick ratchet in a lantern or lamp by a rotary motion of the oil cup or lantern.

Second, Operating the wick ratchet by the rotary motion of a rack or disk.

Third, The circular rack or disk, a, when used for the purpose of operating a lantern wick ratchet.

Fourth, The rack or disk, a, in combination with the pinion, c, and wick ratchet, d.

Fifth, The combination of the rack or disk, a, the pinion, c, and ratchet, d, with the oil cup, C, and base, B, all being constructed and operating substantially as set forth and specified.

46,011.—Pocket Lantern.—John A. Minor, Middletown, Conn.:

I claim a portable or pocket lantern constructed with folding sides and a folding top and bottom substantially as herein shown and described.

I further claim having the rear side, b, of the lantern constructed in the form of a narrow or shallow box provided with receptacles for candles and matches, and having its bottom provided with a pivoted plate to which the candle socket is attached and arranged so that the candle may be adjusted within the lantern or the box, substantially as herein described.

[The object of this invention is to obtain a lantern of simple construction which may, when not in use, be compactly folded and carried in the pocket, and still be capable of being readily unfolded and adjusted for use and possess ample room to contain candles and matches, so that the device may be always ready for use.]

46,012.—Ballot Box.—James A. McPherson, Troy, N. Y.:

First, I claim the combination in a ballot box of the body or receptable, A3, and the top, A', separated by a valve, constructed and applied to each other, substantially as shown.

Second, I also claim the top, A', of the ballot box, composed of an open cylinder with transparent sides, a cover, S, with its valve and bell and hammer and a ballot-retaining mouth piece substantially as above set forth.

Third, I also claim, in a ballot box, retaining the ballot in a receiving mouth set within transparent walls, so that it cannot be withdrawn upwards, but remains suspended for inspection until pushed through the mouth by a succeeding ballot substantially as described.

Fourth, I also claim the removable mouthpiece, 4, constructed so as to retain a ballot suspended in it, and prevent its withdrawal, substantially as above described.

[This invention has for its object the protection of the contents of the ballot box. The body thereof is made of glass, and its mouth is closed by a valve above which is a channel in which the ballot is suspended until the next ballot is inserted, when the former is pushed down into the box.]

46,013.—Wood-saw Frame.—Wm. Morehouse, Buffalo, N. Y.:

I claim straining a saw blade, B, by means of an arched or thrust brace, E, or its equivalent, constructed and operated substantially as described.

46,014.—Sofa.—J. W. Moyer, Cherry Valley, N. Y.:

I claim, first, A sofa or lounge constructed substantially as described; that is to say, with adjustable end pieces, D, D, provided with sector shaped supports, F, F, and a locking arrangement consisting of a pawl, G, and ratchet, H, so that the supporting sector shall at all times form a brace for the back and hinges, and shall form a continuous back and finish when the ends D D, are vibrated from their most erect position.

Second, Making the end finish on the outside of the front of the seat frame so as to cover the joint of vibration of the end pieces, a portion of the front of the latter vibrating immediately within side of the end finish.

[This invention consists in having the ends of the sofa attached to the bottom, a seat by means of hinges or joints, and leaving said ends constructed and arranged in such a manner that they may be adjusted and secured in an upright or nearly upright position like the permanent ends of an ordinary sofa, or be capable of being adjusted and secured in a horizontal or a more or less inclined position so that the sofa may be converted into either a right or left lounge, with an end more or less inclined as desired.

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46,015.—Sawing Machine.—J. W. Moyer, Cherry Valley, N. Y.:

I claim, first, The combination of the slides, M M, moving vertically in guides, f f, and g g, respectively with the screw tension rods, L L, passing through the threaded bearings. b, b', Figure 1, by which the saw is preserved from lateral deflection, rendered capable of relative vertical adjustment and means afforded for the attachment of varying lengths of saws.

Second, The herein described rolling cylindrical bearings, b b b, b', retained by metal straps or boxes, c. c, e, e', applied above and below the levers, F F', respectively and threaded for the passage of the screw tension rods, K L L.

Third, The method of hanging the saw from the upper and lower bearings of the straining rods at, b and b', figures 1 and 3, so that when the levers are horizontal, one of the bearings, b', shall be in a line with the saw, which has a determinate motion by means of its guides, while the other bearing, b, shall be removed an additional distance from its centre of vibration equal to the versed sine of half the arc described by it in its vibrating motion.

[This invention relates to an improved sawing machine of that class which are commonly termed muley sawing machines, and which are generally used for sawing scroll work or wood in curved form The object of this invention is to obtain a machine of the class specified which will admit of the saw being kept at a proper state of tension at all points of its movement, and allowing the same to operate rapidly without creating jars or concussions, and at the same time avoiding the use of any parts which would serve as an obstruction to the feeding of the "stuff" to the saw, and the proper manipulation of the former while being sawed.]

46,016.—Coats with Inner Sleeves.—J. W. Moyer, Cherry Valley, N. Y.:

I claim, as an article of manufacture, a coat with an auxiliary sleeve or cuff, B, within and secured to the outer sleeve, A, as described and represented.

46,017.—Hay Rack.—Andrew Naramor, Berlin Hights, Ohio:

I claim the construction and arrangement of the bolster, C, and pieces, F, in combination with the rack as and for the purpose set orth.

46,018.—Hay Elevating Fork.—W. S. Newton, Norwich, Conn.:

I claim the combination and arrangement of the bar, c, tang or shank, A, with tines and handle attached, semicircular bar, D, and catch lever, E, with the spring, G, and rope, H, connected with it, substantially as and for the purpose herein set forth.

[The object of this invention is to obtain a horse hay fork which may be economically constructed, be strong and durable, and yet light and capable of being manipulated with the greatest facility by the operator.]

46.019.—Coal Screen.—A. M. Olds, Chicago, Ill.:

I claim the end coal screen above described, constructed substantially as set forth and consisting of the closed box, A, A', the part A, being removable and a screen, D, revolving eccentrically within the part, A', said screen having a door at one end or side and being so journaled on the part, A', of the box as to be removable at pleasure.

[This invention consists of a novel arrangement of a revolving screen within a closed box for screening coal and for similar purposes, the screen being suspended eccentrically and the cover of the box being removable.]

46,020.—Cut-off for Steam Engines.—J. H. Paine, Hartford, Conn.:

I claim, first, The spiral cam, J, applied in combination with the governor and with the main valve, C, and cut-off valve, D, substantially as and for the purpose set forth.

Second, The sliding pin, g, and hinged latch, e, in combination with the valves, C, D, and cam, J, constructed and operating substantially as and for the purpose described.

46,021.—Composition for Rendering Barrels Impervious to Oil, etc.—George R. Percy, New York City:

I claim as my invention for coating barrels and other vessels to contain oils and fats is a composition composed of water, borax and shellac in about the proportions specified, with the addition of a small quantity of glycerine, molasses, honey or glue.

And I also claim the process of the previous saturation of the wood with soluble silicate, in combination with the coating of the barrel or vessel with the above-described composition.

46,022.—Compound of Condensed Milk and Uncrystallized Sugar.—George R. Percy, New York City:

I claim the commingling of a quantity of uncrystallizable grape sugar with condensed milk, in the manner substantially as above described.

36,023.—Revolving Fire-arm.—Reuben H. Plass, New York City:

First, I claim the trunnion ring, C c, adapted to embrace the revolving part and to allow it to be turned about on the trunnions, substantially in the manner and for the purpose herein set forth.

Second, I claim the hinged cap or rear piece, G g, arranged and operated substantially as herein represented and described.

Third, I claim, in combination with means for revolving the chambered part, B, on an axis transverse to the line of the barrel, making the face or front end of the chambered part, B, portion of a sphere having its center at the point where said transverse axis crosses the longitudinal axis and giving a corresponding concave form to the adjacent fixed parts, all substantially as and for the purpose within set forth.

Fourth, I claim the convex projection, G2, on the rear face of the cap, G, and the corresponding form of the recesses in the stationary part, A, to serve in combination with the rotating part, B, and perform the double function of a stop and an abutment for the recoil, all substantially as herein set forth.

46,024.—Composition for Varnish, etc.—Peter Prescott, Booneville, N. Y.:

I claim a composition for varnishing, painting, etc., made of the ingredients herein specified and mixed together, substantially in the manner and about in the proportion set forth.

[This invention consists in a composition for varnish, paint, etc., in which shellac forms the base or principal ingredient, and in which the use of alcohol is dispensed with, and a much cheaper, and, in most respects, better solvent is substituted therefor.]

46,025.—Combined Cultivator and Harrow.—Edmund D. Reynolds and O. Bradford Reynolds, North Bridgewater. Mass.:

We claim the combination of the cultivator shares, h, and rotary harrow teeth, m, when so arranged with respect to a carriage, a, that they are self-adjusting in their action upon the soil being cultivated substantially as set forth.

46,026.—Machine for Drying Paper.—George S. Rogers, Thetford Center, Vt.:

I claim the said improved paper-drying machine constructed with one or more drying cylinders, A B, two endless aprons, R S, and sundry guide rollers and planes, arranged in manner and so as to operate substantially as described.

46,027.—Hay Elevator.—Seymour Rogers, Pittsburgh, Pa.:

I claim as an improvement in hay elevators the rod, D, provided with the jointed arms, F F, in connection with the pointed case, A, all arranged to operate in the manner substantially as and for the purpose set forth.

I further claim the notches, e f, in the rod, D, in connection with the spring, G, and the hole, a, in the cap, c, and the eccentric, H, all arranged substantially as and for the purpose specified,

[This invention relates to a new and improved device for elevating hay and depositing it in mows in barns, and also for the forming of stacks, the implement, with its load, being raised by a horse.]

6,028.—Button-hole Cutter.—Francis G. Sanborn, Boston, Mass.:

I claim, first, A cutting bed for cutters and punches to be applied to the shanks of scissors secured and held adjustably on the shank by means of spring pressure, substantially as described.

Second, I also claim the use of the dovetailed or grooved frame of the cutting bed, B, for holding movable blocks of horn, vulcanized or hard rubber or gutta-percha, wood, or other substance for a cutting surface, as above set forth, when the same is applied to the shanks of scissors, substantially as above described.

[This invention consists in certain improvements in the cutting block of a button-hole cutter, to be used and fastened upon one of the shanks of an ordinary pair of scissors, in the way pointed out in Letters Patent granted to the inventor, for a button-hole cutter, on the 4th of Oct., 1864.]

46,029.—Bedstead Fastening.—John C. Santee, Hughesville, Pa.:

First, I claim the lugs, C and E, constructed and applied substantially as herein shown and described, to secure the parts of the bedstead together without mortices.

Second, In combination with the above, I further claim the ribs, R R', for affording an additional support to the rails.

Third, I claim the combination of the plugs, K, and flanges, e', for securing the lugs, e, within the posts substantially as and for the purposes herein set forth.

46,030.—Paper Washer for Paper Stock.—Geo. Escol, Sellers Landing, Ill.:

I claim washing pulp or fiber for paper stock by submitting it to the action of a centrifugal drainer so arranged as to permit the stuff to pass over the draining surface in a gradually thinning sheet, and to be washed by a continuous stream of water passing through it, substantially in the manner and for the purpose specified.

46,031.—Cane Stripper.—Geo. Escol Sellers, Sellers Landing, Ill.:

I claim, first, The stripping or breaking of the branches from the stems of cane or reeds, or stripping off the leaves only by blows struck by revolving arms, slats or blades, the cane or reeds being so fed as to insure contact with the part to be struck off, substantially as specified.

Second, Receiving the stripped cane upon an inclined table arranged with a stop to facilitate bundling, substantially as specified

46,032.—Eraser.—A. G. Shaver, New Haven, Conn.:

I claim an eraser constructed with a file-cut surface in combination with a sharp-cutting or scraping edge or edges, substantially as shown.

Second, An eraser constructed with a file-cut surface in combination with a sharp-cutting or scraping edge or edges and a convex burnishing surface, substantially as shown and described.

46,033.—Apparatus for Extracting Oils, etc.—Lyman Smith, Erie, Pa.:

I claim the tank, A, with perforated bottom, B, and tank, C, in combination with the tube E, and receiving tank, F, constructed and operating substantially as and for the purpose set forth,

46,034.—Metallic Cartridges.—H. C. Spaulding, Brooklyn, N. Y.:

I claim a metallic cartridge coated on its interior with a non-conducting coating, substantially as set forth.

46,035—Mill-stone Pick.—D. C. Stone, Kingston, N. Y.:

I claim the head, B, provided with an opening, a, extending entirely through it, longitudinally, and having a rack, c, at one side in combination with the key, E, and the lip, d, on the inner end of the pick blade, substantially as and for the purpose set forth.

46,036.—Steam Pump.—Levi W. Turrell, Newburgh, N. Y.:

First, I claim the combination of the valves, D1 D2 S1 S2, seated upon a common plate, M, and guided by sockets, d' s'', projecting downward from the cap plates, all as herein described to facilitate the inspection and removal, and replacement of the valves.

Second, In combination with the above, I claim disposing the several chambers of the valve chest, in such a way that the movement of the piston of the pump cylinder, will alternately open two of the valves and close two, in the manner and for the purpose explained.

46,037.—Vessel-of-War.—J. S. Underhill, New York City:

I claim the combination of the horizontal plates, a a, vertical bolt. b b', vertical plates, d d, and screws, e e, all constructed, applied and secured in the manner and for the purposes herein specified.

46,038.—Method of Inking Stamps, etc.—Charles M. Wetherill, Lafayette, Ind.:

I claim the use of an elastic buffer composed of glue and molasses or glycerine, or their equivalents, with or without admixture of insoluble powders, upon which coloring matters are spread with an elastic or firm roller or by other known means, and from which the aforesaid coloring matters may be taken by the pressure of a stamp thereupon, and transferred to the object to be stamped.

46,039.—Fanning Mill.—B. C. White, Richmond, Ind.:

I claim, in combination with the feeding hopper, the hinged adjustable and radially slatted or ribbed feed board, k, operating as and for the purpose substantially as set forth.

I also claim the combination of the rock shaft, d, and its crank arms and the crank wheel, f, with their several connections, to the first moving power and to the shoe, for the purpose of giving the shoe an end and side, or a longitudinal and lateral motion, substantially as and for the purpose described.

I also claim, in combination with the shoe, the loose screen, H, having a shake or jarring motion at its rear lower end, independent of, but in addition to, the motion it has with the shoe, substantially as described.

I also claim, in combination with the shoe, the adjustable windboard frame or slides, and the adjustable wind boards therein, as and for the purpose described.

I also claim the hanging of the shoe by means of the wire links, and turning hooks, by which it may be raised or lowered to adapt it to the blast or the character of the grain being cleaned, substantially as herein described.

46,040.—Shuttle for Looms.—Warren Wilder, Wilkinsonville, Mass.:

I claim the combination and arrangement of the springs, d g, when attached to the spindle shank, b, with cross pins, m, for operating the same, substantially as herein described.

46.041.—Process for making Cast Steel.—S. W. Wood, Cornwall, N. Y.:

I claim making cast steel by melting decarbonized iron, prepared substantially as herein described, in connection, or contact with charcoal, or other form of carbon, either with or without the use of black oxide, manganese or flux, substantially as specified.

46,042.—Extension Ladder.—T. C. Wood, Augusta, Mich.:

I claim the folding ladder, composed of the two parts, A B, connected together as shown, in combination with the removable and adjustable platform, D, all arranged substantially as and for the purpose herein set forth.

[This invention consists in constructing a ladder of two parts, connected by a hinge, and arranged in such a manner that the ladder may be compactly folded for transportation or when not required for use, or be adjusted so as to serve as a short ladder similar to an ordinary step-ladder, and also be capable of being adjusted as a long ladder, the two parts being in line with each other.]

46,043.—Street Steam Railway Car.—J. P. Woodbury, Boston, Mass.:

I claim, first, The combination of the boiler and engine of a locomotive, with a car truck provided with a circular truck frame and anti-friction rollers, so adjusted as to be received within one end of a car so that the truck can turn independently of the car, in the manner and for the purpose herein set forth.

Second, The combination of one end of a railway car with an independent circular locomotive car truck, when constructed in the manner and for the purpose herein described.

Third, Constructing the truck, I, with a circular track, i, provided with anti-friction rollers, h, to support the forward portion of the car, and allow the truck to turn with freedom under it, substantially as described.

Fourth, The independent circular carriage of radial anti-friction rollers to operate in combination with the top of the truck and the bottom of a railway car, substantially as described.

Fifth, Connecting the car to the center pin of the truck frame at the bottom, by means of the connecting bar, V, substantially as described.

Sixth, The employment of a center pin and connecting bar to connect the top of the car with the top of the engine and boiler truck, substantially as shown in figure 9.

Seventh, Forming the front of the passenger car concave and the engine and boiler room convex and circular, so that the one may turn in the other, substantially as represented in figures 7, 8, 9 and 10.

Eighth, Making the rear truck to turn on a center pin in the rear end of the car body, in combination with the circular tracks and carriage of radial anti-friction rollers which support the car body on the truck, substantially as described

Ninth, The anti-friction wheels, m, to operate in combination with the revolving engine room and passenger car, substantially as described.

Tenth, So constructing and arranging the smoke and exhaust pipe as to pass through the top of the car, directly over the center pin, U, wherever the boiler is placed, so that when the truck frame turns on a curve, said pipe may also turn with freedom through the car top, substantially as described.

46,044.—Grain Separator.—Elijah Young, Tuscarora, N. Y.:

I claim, first, So constructing and arranging the sieve, F, that it may be elevated at its rear end sufficiently to prevent any grain from passing over that end, substantially as and for the purpose set forth.

Second, Connecting the sieve, E, to the shoot board by means of hinges, as set forth and described.

Third, In combination with the vertically adjustable sieve, E, as described, the longitudinally adjustable discharging screen, C, as and for the purpose set forth.

46,045.—Coal-oil Lamp and Gas Stove.—Joshua E. Ambrose, Middletown, N. Y., assignor to Sarah T. Ambrose, Passaic, N. J.:

First, I claim the use or employment of the mica in the sides, bottom and top of the ovens, for the purpose specified.

Second, In combination with the stove, constructed as described, I claim the use or employment of the reservoir, J, and tubing, K, for the purpose specified.

Third, I claim the flue, B, constructed as shown for the purpose specified.

Fourth, I claim the use or employment of the dampers, E, in combination with the flue, B, for the purposes set forth.

Fifth, I claim combining with a stove, provided with the side ovens, C, the flue, B, for the purpose specified.

45,046.—Wringing Machine.—George N. Bolles (assignor to S. W. Walker & Co.), Kalamazoo, Mich.:

I claim, first, The two frames, A A', provided with rollers, C C, and connected together by the joints, B B, as shown, in connection with the elastic bar, E, spring, F, and set screw, G, all arranged substantially as and for the purpose specified.

Second, I claim the gearing, c c d d, in combination with the two frames, A A', and rollers, C C, substantially as and for the purpose set forth.

[This invention relates to a new and improved device for wringing clothes, such as are provided with pressure rollers, and it consists in a novel construction of the frame fastening for securing the wringer to the tub and gearing, whereby a very simple and efficient wringer is obtained, and one which may be manufactured at a very moderate expense.]

46,047.—Horse Hay-fork.—D. B. Clements (assignor to himself and D. H. Nash), Brooklyn, N. Y.:

First, I claim the arrangement of the link, c, connecting the hay-elevating fork with the hoisting mechanism and provided with the latch, 2, in combination with the metallic stock or handle, as specified.

Second, I claim the tooth, i, fitted to swing over the tines for holding the hay in its place in said tines, as specified,

46,048.—Machine for Pulverizing the Soil.—Lemuel S. Fithian, Absecom, N. J., assignor to himself and John Young, Joliet, Ill.:

I claim, first, Constructing the rotary pulverizer in sections, the cutters, M, of which coincide with frustums of a cone or cones, Substantially as and for the purpose specified.

Second, Giving the cutters, M, a raking position, and also an oblique position on the heads, L', substantially as and for the purpose set forth.

46,049.—Mode of Protecting the Surfaces of Wooden Piles.—Levy J. Henry (assignor to Joseph Beurime), San Francisco, Cal.:

I claim the use of alternate layers of asphaltum and sand or earth applied to piles and other articles exposed to the action of marine insects or worms, for the purposes specified.

I also claim coating or protecting piles and other articles from the action of salt water by means of asphalt applied upon sheets of felt or other material attached to said articles, in the manner and for the purposes specified.

46,050.—Window Shade Adjuster.—Enos T. Higham (assignor to himself and D. Higham), Philadelphia, Pa.:

I claim the grooved screw, A and h, bar, e, and the knob, f, or its equivalent, the whole being arranged and operating as and for the purpose herein set forth.

46,051,—Press.—P.C. Ingersoll (assignor to himself and Horace F. Dougherty), Greenpoint, N. Y.:

I claim, first, Elevating and depressing the follower by means of a screw shaft having its lower end fitted loosely to the follower, combined with suspension rods, g g, substantially as described.

Second, The combination of the loosely-fitting yoke, K, screw shaft, F, and suspension rods, g g, with a follower, substantially as described.

Third, Providing for opening the upper end of the press box by the employment of a laterally sliding follower, applied and operating substantially as described.

Fourth, The laterally sliding screw support or bridge beam, E E', in combination with the follower, G G', and supporting bars, a a, substantially as described.

Fifth, The friction rollers, b b, and bridge beams, E E', in combination with the holding-down beams, a a, substantially as described.

Sixth, The stops, i i, or their equivalents, in combination with the laterally adjustable bridge beams, E E', substantially as described.

46,052.—Field Fence.—Peter W. Knisken (assignor to himself and Jared G. Scott), Monee, Ill.:

I claim a portable fence with the adjoining ends of the boards recessed and notched in the particular manner herein shown and described, so that they will fit and lock together in either position, to produce at will a straight or a worm fence, as specified.

[The object of this invention is a portable field fence which can be readily put up or taken down whenever it may be desirable, and which can be used as a straight or as a worm fence without changing any of its parts.]

46,053.—Lamp.—Eliakim Marsh (assignor to himself and Augustus Marsh), Newark, N. J.:

I claim attaching together the deflectors, b, and the button, f, in the manner hereinabove specified.

46,054.—Method of Converting Muzzle into Breech-loading Fire-arms.—Chas. E. Sneider (assignor to himself and Thomas Poultney), Baltimore, Md.:

First, I claim the lug bar, C, attached to the barrel by screws, c c c, and provided with projections, D D', for the pivoting of the bar, E, and lever, L, to the barrel, in the manner and for the purposes set forth.

Second, I claim the pivoted bar, E, constructed and employed as described, for the attachment of the breech, G, of a double or single-barrelled gun, for converting the same to a breech-loader, the said bar being provided with a projection, E', at its rear end, and an abutment, E2, fitting the inclined back of the projection, I, on the lug bar, C, so as to constitute, in combination with the said lug bar, a rigid connection between the breech and barrel, while in position for firing, as explained.

46,055.—Brick Machine.—James Ward (assignor to himself and Garret A. Lans), Boston, Mass.:

I claim the combination and arrangement of the two adjustable scrapers, K L, with the preparing rollers, G H, the case, E, and the mold carriage, A.

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I also claim the combination of the auxiliary roller, I, its chamber, N, and its adjustable scraper, M, with the mold carriage, A, the rollers, G H, the case, E, and the scrapers, K L, arranged together and within the case, E, substantially as specified.

I also claim the arrangement of the mold wheel, A, the case, E, the shaft, h, the roller, I, the chamber, N, and the mechanism for operating the rollers, G H, and the mold carriage, A.

I also claim the combination and arrangement of the annular rail, d, and the series of friction rollers, e, with the mold carriage and the series of plungers thereof,

I also claim the combination and arrangement of the series of lifters, c, and their cams, B C D, with the rotary mold carriage, A, the rail, d, and the series of friction wheels c.

46,056.—Machine for Punching Metal.—E. R. Hollands, Northampton Square, England :

I claim the combination of the tool holder with the movable wedge, the mechanism for moving it, the rollers and the inclines, or their equivalents, operating substantially as hereinbefore set forth.

46,057.—Machine for Making Cords, Ropes, etc.—Jules O. Methieu, of Paris, France. Patented in France, Feb. 12, 1863 :

I claim the arrangement of the flyer and bobbins or spools with their described intermediary connecting and operating parts, when constructed, arranged and operating as and for the purpose herein described and represented.

46,058.—Apparatus for Measuring and Testing Spirits and other Distillates.—Edward Payne, London, England :

I claim, in connection with a still or distillery, the combined use in one instrument, of a measuring and of a sampling apparatus, substantially as herein described, whereby small quantities of the spirit that passes over or through the apparatus, is retained for an after test of its proof, and beyond the reach of the operator, whilst the measured bulk or quantity passes through to any common receiver.

46,059.—Lamp.—Guiseppe Antonia Tremeschini, Vicenza, Austria :

I claim, first, The arrangement of the copper cone, A, and deflector, T2, in relation to each other and to the disk, Q, and its air openings, T, for the purpose of admitting air from below the disk, deflecting it against the copper cone to be highly heated, and thence carried to supply combustion at the slot, at its upper end, as described.

I also claim the arranging of the wicks, b f g, within a tube E, that is, movable, within an outer stationary tube, B, and an intervening air space between them, as and for the purpose described.

I also claim securing the heads of the lamp to the bowl by means of a conical shank on the former, and a conical socket on the latter, the two making a tight metallic ground joint, substantially as described.

I also claim filling the lamp through an opening in the side of the neck thereof, by means of an instrument substantially such as described, that will flow off the excess of burning fluid beyond a given hight, as described and represented.

46,060.—Composition for Lining Barrels for holding Petroleum.—Henry Lowenberg, New York City, assignor to himself and Emile Granier, Paris, France. Ante-dated Dec. 10, 1864 :

I claim a substitute for india-rubber or composition made of the ingredients herein specified, and mixed together in about the proportion and substantially in the manner set forth.

RE-ISSUES.

1,854.—Curry Comb.—Cyrus W. Saladee, Putnam, Ohio. Patented Dec. 27, 1864 :

I claim, first, The two metallic handles, A' A', or their equivalent, secured to the sides or ends of the curry comb, in the manner and for the purpose substantially as shown and described.

Second, I claim the frame or plate, A, rivets, B B B B, studs, D D D D, figure 1, projections, figure 3, in combination with the adjustable handles, A' A', in the manner and further purpose, substantially as shown and described.

1,855.—Folding Table.—Joseph W. Wayne and Joseph R. Miller, Cincinnati, Ohio. Patented Jan. 12, 1864 :

I claim the folding table, having one pair of legs, B B', hinged to the top, A', and another pair of legs, D D', pivoted to and intersecting with the first pair, the upper ends of the legs, D D', being, in the standing condition of the table secured to the top by sockets, a a', and catches, E E', or their equivalents, and being wholly disconnected from the top for folding, as herein explained.

DESIGNS.

2,025 to 2,026.—Carpet Patterns.—Elemir J. Ney (Assignor to the Lowell Manufacturing Company), Lowell, Mass. Two Cases.

PATENTS

GRANTED

FOR SEVENTEEN YEARS.

MUNN & COMPANY,

In connection with the publication of the SCIENTIFIC AMERICAN, have acted as Solicitors and Attorneys for procuring "Letters Patent" for *new inventions* in the United States and in all foreign countries during the past *seventeen years*. Statistics show that nearly ONE-THIRD of all the applications made for patents in the United States are solicited through this office; while nearly THREE-FOURTHS of all the patents taken in foreign countries are procured through the same source. It is almost needless to add that, after *seventeen years'* experience in preparing specifications and drawings for the United States Patent Office, the proprietors of the SCIENTIFIC AMERICAN are perfectly conversant with the preparation of applications in the best manner, and the transaction of all business before the Patent Office; but they take pleasure in presenting the annexed testimonials from the three last ex-Commissioners of Patents.

MESSRS. MUNN & CO.:—I take pleasure in stating that, while I held the office of Commissioner of Patents, MORE THAN ONE-FOURTH OF ALL THE BUSINESS OF THE OFFICE CAME THROUGH YOUR HANDS. I have no doubt that the public confidence thus indicated has been fully deserved, as I have always observed, in all your intercourse with the office, a marked degree of promptness, skill, and fidelity to the interests of your employers. Yours very truly,

CHAS. MASON.

Judge Mason was succeeded by that eminent patriot and statesman, Hon. Joseph Holt, whose administration of the Patent Office was so distinguished that, upon the death of Gov. Brown, he was appointed to the office of Postmaster-General of the United States. Soon after entering upon his new duties, in March, 1859, he addressed to us the following very gratifying letter.

MESSRS. MUNN & CO.:—It affords me much pleasure to bear testimony to the able and efficient manner in which you discharged your duties as Solicitors of Patents, while I had the honor of holding the office of Commissioner. Your business was very large, and you sustained (and I doubt not justly deserved) the reputation of energy, marked ability, and uncompromising fidelity in performing your professional engagements.

Very respectfully, your obedient servant,

J. HOLT.

Hon. Wm. D. Bishop, late Member of Congress from Connecticut, succeeded Mr. Holt as Commissioner of Patents. Upon resigning the office he wrote to us as follows:

MESSRS. MUNN & CO.:—It gives me much pleasure to say that, during the time of my holding the office of Commissioner of Patents, a very large proportion of the business of inventors before the Patent Office was transacted through your agency; and that I have ever found you faithful and devoted to the interests of your clients, as well as eminently qualified to perform the duties of Patent Attorneys with skill and accuracy. Very respectfully, your obedient servant,

WM. D BISHOP.

THE EXAMINATION OF INVENTIONS.

Persons having conceived an idea which they think may be patentable, are advised to make a sketch or model of their invention, and submit it to us, with a full description, for advice. The points of novelty are carefully examined, and a written reply, corresponding with the facts, is promptly sent, free of charge. Address MUNN & CO., No. 37 Park Row, New York.

As an evidence of the confidence reposed in their Agency by inventors throughout the country, Messrs. MUNN & CO. would state that they have acted as agents for more than TWENTY THOUSAND inventors! In fact, the publishers of this paper have become identified with the whole brotherhood of inventors and patentees, at home and abroad. Thousands of inventors for whom they have taken out patents have addressed to them most flattering testimonials for the services rendered them; and the wealth which has inured to the individuals whose patents were secured through this office, and afterwards illustrated in the SCIENTIFIC AMERICAN, would amount to many millions of dollars! Messrs. MUNN & CO. would state that they never had a more efficient corps of Draughtsmen and Specification Writers than those employed at present in their extensive offices, and that they are prepared to attend to patent business of all kinds in the quickest time and on the most liberal terms.

PRELIMINARY EXAMINATIONS AT THE PATENT OFFICE.

The service which Messrs. MUNN & CO. render gratuitously upon examining an invention does not extend to a search at the Patent Office, to see if a like invention has been presented there; but is an opinion based upon what knowledge they may acquire of a similar invention from the records in their Home Office. But for a fee of $5, accompanied with a model, or drawing and description, they have a special search made at the United States Patent Office, and a report setting forth the prospects of obtaining a patent, &c., made up and mailed to the inventor, with a pamphlet, giving instructions for further proceedings. These preliminary examinations are made through the Branch Office of Messrs. MUNN & CO., corner of F and Seventh streets, Washington, by experienced and competent persons. Many thousands of such examinations have been made through this office, and it is a very wise course for every inventor to pursue. Address MUNN & CO., No 37 Park Row, New York.

HOW TO MAKE AN APPLICATION FOR A PATENT.

Every applicant for a patent must furnish a model of his invention if susceptible of one; or, if the invention is a chemical production, he must furnish samples of the ingredients of which his composition consists, for the Patent Office. These should be securely packed, the inventor's name marked on them, and sent, with the Government fees, by express. The express charge should be pre-paid. Small models from a distance can often be sent cheaper by mail. The safest way to remit money is by a draft on New York, payable to the order of Messrs. MUNN & CO. Persons who live in remote parts of the country can usually purchase drafts from their merchants on their New York correspondents; but, if not convenient to do so, there is but little risk in sending bank bills by mail, having the letter registered by the postmaster. Address MUNN & CO., No. 37 Park Row, New York.

Patents are now granted for SEVENTEEN years, and the Government fee required on filing an application for a patent is $15. Other changes in the fees are also made as follows :—

On filing each Caveat	$10
On filing each application for a Patent, except for a design	$15
On issuing each original Patent	$20
On appeal to Commissioner of Patents	$20
On application for Re-issue	$30
On application for Extension of Patent	$50
On granting the Extension	$50
On filing a Disclaimer	$10
On filing application for Design (three and a half years)	$10
On filing application for Design (seven years)	$15
On filing application for Design (fourteen years)	$30

The Patent Laws, enacted by Congress on the 2d of March, 1861 are now in full force, and prove to be of great benefit to all parties who are concerned in new inventions.

The law abolishes discrimination in fees required of foreigners, excepting natives of such countries as discriminate against citizens of the United States—thus allowing Austrian, French, Belgian, English, Russian, Spanish and all other foreigners, except the Canadians, to enjoy all the privileges of our patent system (except in cases of designs) on the above terms. Foreigners cannot secure their inventions by filing a caveat; to citizens only is this privilege accorded.

CAVEATS.

Persons desiring to file a caveat can have the papers prepared in the shortest time by sending a sketch and description of the invention. The Government fee for a caveat is $10. A pamphlet of advice regarding applications for patents and caveats is furnished gratis, on application by mail. Address MUNN & CO., No. 37 Park Row, New York.

REJECTED APPLICATIONS.

Messrs. MUNN & CO. are prepared to undertake the investigation and prosecution of rejected cases, on reasonable terms. The close proximity of their Washington Agency to the Patent Office affords them rare opportunities for the examination and comparison of references, models, drawings, documents, &c. Their success in the prosecution of rejected cases has been very great. The principal portion of their charge is generally left dependent upon the final result.

All persons having rejected cases which they desire to have prosecuted, are invited to correspond with MUNN & CO., on the subject, giving a brief history of the case, inclosing the official letters, &c.

FOREIGN PATTENS.

Messrs. MUNN & CO., are very extensively engaged in the preparation and securing of patents in the various European countries. For the transaction of this business they have offices at Nos. 66 Chancery lane, London; 29 Boulevard St. Martin, Paris; and 26 Rue des Eperonniers, Brussels. They thing they can safely say that THREE-FOURTHS of all the European Patents secured to American citizens are procured through their agency.

Inventors will do well to bear in mind that the English law does no limit the issue of patents to inventors. Any one can take out a patent there.

Circulars of information concerning the proper course to be pursued in obtaining patents in foreign countries through MUNN & CO'S Agency, the requirements of different Government Patent Offices, &c. may be had, gratis, upon application at the principal office, No. 37 Park Row, New York, or any of the branch offices.

SEARCHES OF THE RECORDS.

Having access to all the official records at Washington, pertaining to the sale and transfer of patents, MESSRS. MUNN & CO., are at all times ready to make examinations as to titles, ownership, or assignment of patents. Fees moderate.

INVITATION TO INVENTORS.

Inventors who come to New York should not fail to pay a visit to the extensive offices of MUNN & CO. They will find a large collection of models (several hundred) of various inventions, which will afford them much interest. The whole establishment is one of great interest to inventors, and is undoubtedly the most spacious and best arranged in the world.

MUNN & CO. wish it to be distinctly understood that they do not speculate or traffic in patents, under any circumstances; but that they devote their whole time and energies to the interests of their clients.

COPIES OF PATENT CLAIMS.

MESSRS. MUNN & CO., having access to all the patents granted since the rebuilding of the Patent Office, after the fire of 1836, can furnish the claims of any patent granted since that date, for $1.

THE VALIDITY OF PATENTS.

Persons who are about purchasing patent property, or patentees who are about erecting extensive works for manufacturing under their patents, should have their claims examined carefully by competent attorneys, to see if they are not likely to infringe some existing patent, before making large investments. Written opinions on the validity of patents, after careful examination into the facts, can be had for a reasonable remuneration. The price for such services is always settled upon in advance, after knowing the nature of the invention and being informed of the points on which an opinion is solicited. For further particulars address MUNN & CO., No. 37 Park Row, New York.

EXTENSION OF PATENTS.

Many valuable patents are annually expiring which might readily be extended, and if extended, might prove the source of wealth to their fortunate possessors. Messrs. MUNN & CO. are persuaded that very many patents are suffered to expire without any effort at extension, owing to want of proper information on the part of the patentees, their relatives or assigns, as to the law and the mode of procedure in order to obtain a renewed grant. Some of the most valuable grants now existing are *extended patents*. Patentees, or, if deceased, their heirs, may apply for the extension of patents, but should give ninety days' notice of their intention.

Patents may be extended and preliminary advice obtained, by consulting, or writing to, MUNN & CO., No. 37 Park Row, New York.

ASSIGNMENTS OF PATENTS.

The assignment of patents, and agreements between patentees and manufacturers, carefully prepared and placed upon the records at the Patent Office. Address MUNN & CO., at the Scientific American Patent Agency, No. 37 Park Row, New York.

UNCLAIMED MODELS.

Parties sending models to this office on which they decide not to apply for Letters Patent and which they wish preserved, will please to order them returned as early as possible. We cannot engage to retain models more than one year after their receipt, owing to their vast accumulation, and our lack of storage room. Parties, therefore, who wish to preserve their models should order them returned within one year after sending them to us, to insure their obtaining them. In case an application has been made for a patent the model is in deposit at the Patent office, and cannot be withdrawn.

It would require many columns to detail all the ways in which the Inventor or Patentee may be served at our offices. We cordially invite all who have anything to do with patent property or inventions to call at our extensive offices, No. 37 Park Row, New York, where any questions regarding the rights of Patentees, will be cheerfully answered.

Communications and remittances by mail, and models by express (prepaid) should be addressed to MUNN & CO. No. 37 Park Row, New York.

Notes and Queries

J. G. C., of Iowa.—1,000,000 parts of cast iron at 62° Fah., become, at 212°, 1,000,893. The expansion of wrought iron with the same increase of heat is from 1,000,000 to 1,000,984.

C. B., of Mich., asks how a man is to obtain redress against an infringer of his patent. Answer—Bring a suit. An infringer is liable to imprisonment if he does not, when ordered by the Court, desist from making a patented machine. All persons who use a machine without the consent of the inventor are liable for damages.

F. W. L., of Vt.—You will find it a dangerous experiment to attempt filling cartridges with fulminating mercury unless you know somethin g of its properties and how to handle it.

T. F. of Wis.—A liquid glue is made in the following manner: white glue, 16 ounces; white lead, dry, 4 ounces; soft water, 2 pints; alcohol, 4 ounces. Stir the ingredients together and bottle while hot.

L. H. W., of Mass.—The owner of a patent is not, by law, compelled to put the patented article on sale.

J. P., of N. J.—One bulk of sulphuric acid to ten of water is said to be the usual pickle for removing sand from iron castings.

W. F. R., of Pa.—A good alloy for journal boxes is 24 copper, 24 tin and 8 antimony. Melt the copper first, then the tin, then add the antimony. It should be run into ingots and cast in boxes afterward.

R. H. M., of Pa.—Messrs. J. R. Brown & Sharpe, of Providence, R. I., will furnish you with a machine for cutting scales or indices on circles, squares, polygons, or figures of any known form.

J. M. A., of Canton.—We have received no former communication from you. When you write again inform us in what State you reside.

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E. T., of D. C.—If your amendments to the patent law should be adopted we suspect that you would find in the practical operation difficulties and evils that you do not anticipate. It is a pity that all people will not respect the rights of others, then we should need no laws. When we attempt to make them do this by means of laws we find it a very difficult task, as all experience shows. When individual interest is enlisted men are exceedingly adroit in eluding the vigilance of statutes. It is probable that no law was ever enacted which did not prove less efficient for good and more productive of evil than its originator anticipated. The amendment proposed we consider impracticable. No Govern ment would thus interpose to make positively valid the acts of men who are not infallible.

J. D., of N. Y.—There is no rule for showing the loss of power by the crank motion, because there is no loss. You will find this question very fully discussed in back numbers of this journal.

H. L., of Conn.—You will find in various hand-books of the steam engine for the last twenty years the information you require about the history of steam boilers. If you can have access to a library of mechanical works you can compile what you require readily, but you will find it difficult to get at anything satisfactory or reliable by desultory research. It is a long story to tell in a lecture.

J. W. C., of Wis.—You can use superheated steam for drying and boiling purposes with economy, provided the heat which the steam absorbs is otherwise wasted, or passes off unused. You can boil in any vessel that the steam surrounds, or dry on any apparatus which contains the steam.

A. H. C., of R. I.—Superheated steam may be at the temperature of red heat at a pressure of ten pounds, or two pounds to the square inch, or at any other pressure below that of saturated steam at that temperature. In the place spoken of it is employed to carry the air into a forge furnace.

J. R. N.—The attractive power of a magnet diminishes in proportion to the square of the distance, measuring from a point a little within the end. The powers of magnets vary with so many circumstances that no general rule can be given. There is a magnet in this city that supports seven men, and would probably support many more.

J. H., of Ohio.—The power of a magneto-electric machine is obtained by the slow combustion of zinc, which is worth 20 cents per pound—$400 per tun, while coal for a steam engine is worth only $10 per tun. The cost of power in a magneto-electric machine is at least forty times greater than in a steam engine.

T. V., of Ind.—We have several recipes for water-proof cement. One is, incorporate thoroughly eight parts of melted glue, of the consistence used by carpenters, with four parts of lin seed oil, boiled into varnish with litharge. It hardens in about forty-eight hours. It is also said that a compound of glue with one-fourth its weight of Venice turpentine, made as above, serves to cement glass water-tight. We should be pleased to hear from some correspondent, who knows by practical experiment, of a good cement for aquaria.

S. R. H., of Md.—A steel bar can be divided into any required number of degrees; so fine, in fact, that the naked eye can t distinguish them. Messrs. J. R. Brown & Sharpe, of Providence, R. I., have machinery for this purpose.

Money Received

At the Scientific American Office, on account of Patent Office business, from Wednesday, January 18, to Wednesday, January 25, 1865:—

H. C. K., of N. Y., $25; J. W. H., of N. Y., $25; T. & J. B., of N. Y., $25; W. E. R., of N. Y., $40; S. Van S., of N. J., 0; H. B., of N. Y., $15; R. E., of N. Y., $30; W. & W., of Pa., $22; W. L. F., of N. Y., $22; S. J. A., of Me., $20; P. R, of Conn., $30; J. G. M., of N. J., $15; H. J. H., of N. Y., $20; M. B. D., of N. Y., $40; P. L., of N. Y., $15; J. L. T., of Me., $20; A. M. O., of Ill., $40; T. S. S., of N. Y., $40; P. & B., of N. Y., $15; C. L. B., of Conn., $20; J. J. R., of Ohio, $20; A. P., of Hanover, $40; J. M. C., of N. Y., $15; W. S., of Mich., $20; D. C. A., of Iowa, $20; J. H., of N. Y., $20; R. & C., of Conn., $20; J. V. W., of N. Y., $15; W. E. R., of N. Y., $40; R. C. & M., of N. Y., $55; J. T. S., of N. J., $40; W. V. McK., of N. J., $15; A. M. H., of N. Y., $40; W. R., of N. J., $45; L. D., of N. Y., $25; S. C. B., of N. Y., $45; S. B., of N. J., $20; C. N., of N. Y., $20; G. F. J. C., of N. J., $20; D. S., of N. Y., $15; Mrs. L. E. S., of Ill., $20; W. S. W., Jr., of Ill., $45; J. N. E., of N. Y., $10; H. J., of N. Y., $20; S. S. S., of N. Y., $15; J. B., of N. Y., $15; T. R. T., of N. Y., $416; J. S. A., of N. Y., $100; W. G. W. J., of Md., $10; H. B., of Pa., $22; A. M. H., of Conn., $15; T. R., of N. Y., $20; A. H. N., of Mass., $15; W. W. T., of N. Y., $30; W. C., of Ohio, $25; O. K., of C. W., $37; T. I. B., of Tenn., $20; V. W. B., of Vt., $35; L. S., of Pa., $233; W. E. R., of Ill., $25; E. & B., of Me., $25; H. P. A., of Ohio, $15; H. F. H., of Ill., $202; P. B., of N. Y., $15; T. & M., of Ind., $25; C. L. McD., of Iowa, $16; C. C. T., of Me., $16; C. C. C., of Ill., $16; L. D. W., of Conn., $15; J. A. B., of Ill., $40; B. F. W., of Ind., $25; H. & Z., of Pa., $16; J. P. B., of Me., $16; A. Bro., of Conn., $25; S. B. H., of Pa., $16; D. G. H., of Mass., $65; J. W., of Mich., $20; M. B., of Conn., $15; L. R., of N. Y., $16; V. C., of Ohio, $16; J. H. M., of Mo., $16; R. & J., of Ill., $16; S. S., of N. Y., $25; J. L. G., of Mass., $15; R. L. S., of N. Y., $30; J K. & C. B. C., of Iowa, $25; D. & H., of Wis., $10; J. C. & G. S., of Mass., $30; A. M., of N. H., $25; E. S. H., of Mass., $16; J. L. S., of Ind., $20; J. E. P., of N. Y., $25; F. J. R. of Ill., $45; P. E., of N. Y., $15; B. & H., of N. Y., $15.

Persons having remitted money to this office will please to examine the above list to see that their initials appear in it, and if they have not received an acknowledgment by mail, and their initials are not to be found in this list, they will please notify us immediately, stating the amount and how it was sent, whether by mail or express.

Specifications and drawings and models belonging to

parties with the following initials have been forwarded to the Patent Office, from Wednesday, Jan. 18, to Wednesday, Jan. 25, 1865:—

H. C. K., of N. Y.; J. H. H., of N. Y.; E. A. P., of Wis.; F. & J. B., of N. Y.; W. E. R., of N. Y.; S. Van S., of N. J.; H. B., of N. Y.; H. L. H., of N. Y.; H. B., of N. Y.; R. E., of N. Y.; W. & W., of Pa.; W. L. F., of N. Y.; P. P., of Conn.; M. B. D., of N. Y.; R. C. & M., of N. Y.; J. T. S., of N. J.; A. M. H., of N. Y.; L. D., of N. Y.; S. C. B., of N. Y.; W. E. R., of N. Y.; W. C., of Ohio; W. W. T., of N. Y.; W. E. R., of Ill.; J. L. B., of Pa.; E. & B., of Me.; W. H. C., of Ind.; W. B. D., of Conn.; W. P. & H. A. A., of Conn; T. & M., of Ind.; V. W. B., of Vt.; B. F. W., of Ind.; J. C. & G. S., of Mass.; R. L. S., of N. Y.; S. H., of Ohio; A. M., of N. H.; S. S. S., of N. Y.; I. C. P., of Ill.

TO OUR READERS.

PATENT CLAIMS.—Persons desiring the claim of any invention which has been patented within thirty years, can obtain a copy by addressing a note to this office, stating the name of the patentee and date of patent, when known, and enclosing $1 as fee for copying. We can also furnish a sketch of any patented machine issued since 1853, to accompany the claim, on receipt of $2. Address MUNN & CO., Patent Solicitors, No. 37 Park Row, New York.

MODELS are required to accompany applications for Patents under the new law, the same as formerly, except on design patents, when two good drawings are all that are required to accompany the petition, specification and oath, except the Government fee.

RECEIPTS.—When money is paid at the office for subscriptions, a receipt for it will always be given; but when subscribers remit their money by mail, they may consider the arrival of the first paper a *bona-fide* acknowledgement of our reception of their funds.

INVARIABLE RULE.—It is an established rule of this office to stop sending the paper when the time for which it was pre-paid has expired.

Back Numbers and Volumes of the "Scientific American."

VOLUME IV., AND VOLUME XI.. (NEW SERIES) complete (bound) may be had at this office and from periodical dealers. Price, bound, $3 00 per volume, by mail, $3 75 which includes postage. Every mechanic, inventor or artisan in the United States should have a complete set of this publication for reference ubscribers should not fail to preserve their numbers for binding. VOLS. I., II., III., V., VI., VII., VIII., IX. and X., are out of print and cannot be supplied.

RATES OF ADVERTISING.

TWENTY-FIVE CENTS per line for each and every insertion, payable in advance. To enable all to understand how to calculate the amount they must send when they wish advertisements published we will explain that eight words average one line. Engravings will not be admitted into our advertising columns, and, as heretofore, the publishers reserve to themselves the right to reject any advertisement they may deem objectionable.

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while all other matches were excluded from the building, and the committee were right, for in the

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THE BEST ESSAYS,
THE BEST POEMS,

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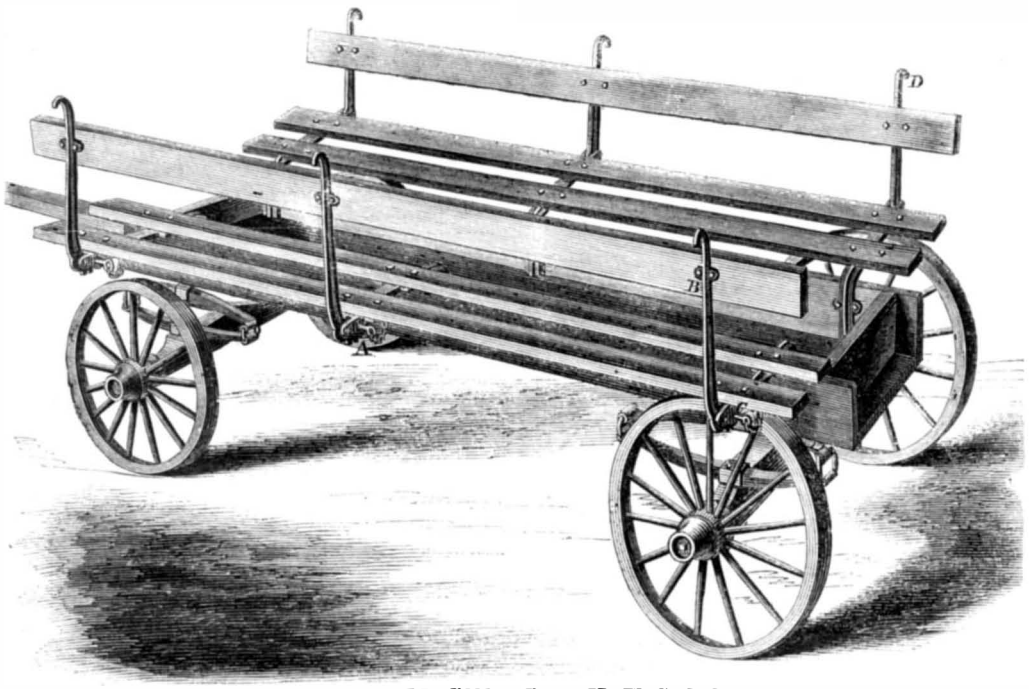
Anything tending to aid the farmer in his labors should be tried, and adopted if found useful. We illustrate herewith an improved arrangement for hay wagons, which will much facilitate the operation of loading. The inventor says:—

"There are many features about this rigging that make it very cheap, convenient and durable. From the engraving it may be seen that it is attached to an ordinary wagon box. It can be put on or taken off in five minutes by one person, requiring simply a wood



REED'S RIGGING FOR HAY CARTS.

screw for each arm, to hold it in place. Many farmers having but one wagon to do all their work with are thus saved the trouble of taking off a cumbrous rigging and putting on a heavy box to go to mill or church, and vice versa. As the rigging is made of iron there can be no question as to its durability. There is an adjustable arm, A, at the end of the projecting arm, so that the vertical arm, B, may be set at any required angle, by inserting a pin, as at C, between the cogs on the end of the arm.

"The old method of binding with a pole is obviated by the use of this arrangement, and the load is held more securely by passing a rope from the hooks, D, at the tops of the vertical arms, from side to side, over the hay. This comprises the principal features."

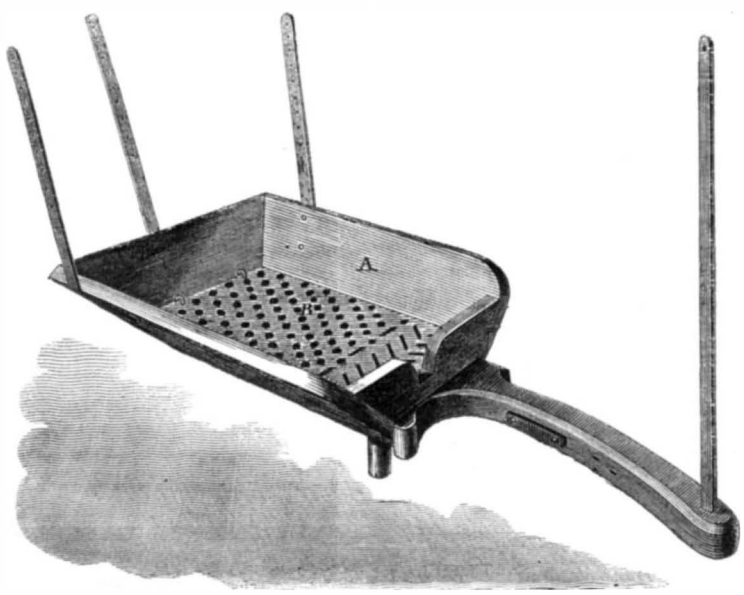
This invention was patented by Osmond Reed, on May 20, 1862. Further information can be had by addressing Reed & Chesebro, Grand Rapids, Mich. See advertisement on another page.

Improved Mill Shoe.

This invention consists in providing the shoe to the hopper of a millstone, with a screen arranged in such a manner as to effectually separate sand, cockle and other impurities, from the grain before the latter passes into or between the stones.

"This improvement," says the inventor, "separates these impurities from the grain, by passing it through or over the shoe in small quantities, just previous to entering into the eye of the stone. A represents the shoe, which is hung or suspended underneath the hopper of millstones. This shoe may be constructed and hung in the usual way.

"The novel parts are a round opening in the bottom of the shoe, underneath which there is another opening to conduct the impurities from the shoe into any receptacle prepared to receive them. Second, A screen, B, is placed within the shoe, one end of which is attached to the rear end of the shoe by joints, while the opposite end rests on a shoulder or ledge. At the front part of the shoe a space of a proper depth is allowed between the screen, B, and the bottom of the shoe. To the screen, B, there is attached a transverse strip, not shown, which is inclined, and forms a partition, or barrier, within the shoe. This partition has two openings or notches made in its



CROUSE'S MILL SHOE.

lower edge, and in the front end of the screen there is also an opening.

"The shoe, A, has the usual vibrating movement communicated to it by means of the ordinary damsel, and the grain falls from the hopper upon the screen, B, and passes down said screen, owing to an inclination given to the partition or barrier, which arrests the progress of the grain, and causes it to be evenly distributed over the screen, the grain finally passing through the opening or notches before mentioned, and out through the opening in the front end of the shoe, and falling into the eye of the stone. The sand, cockle, smut, chess, etc., pass through the screen, B, and are discharged through the opening and spout, C. The oblong hole in the front end of the screen is designed for the chess to pass through.

"The device performs its work well, the shoe cannot become choked or clogged, or rendered inoperative by small sticks or like impurities."

This invention was patented on Nov. 8, 1864, by H. P. Crouse, of Hartland, Mich., whom address for further information.

Professor Church, of the Royal Agricultural College, Cirencester, has recently been describing a new mineral from Australia. It is a sort of combustible shale, which occurs near the river Morsey, north side of Tasmania, and from it Professor Church has extracted a substance which he calls tasmanite. It seems to resist the action of all but sulphuric and nitric acids; alcohol, ether, and other powerful dissolvents have no action upon it, even on the application of heat, and its composition chiefly consists of carbon, hydrogen, and sulphur. When tasmanite is heated in the air, it burns readily with a very smoky flame and offensive odor, recalling that of some specimens of Canadian petroleum.

Joseph Whitworth, of England, asserts that he makes, or has made, musket barrels of steel so thoroughly annealed that they bulge when overloaded instead of bursting.

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